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The Economic Record

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THE AUSTRALIAN ECONOMY, MARCH 1958

The Australian economy, which has expanded rapidly in the last ten years and suffered from some growing pains in the process, has recently enjoyed an easing of pressures. It is now in a favourable position to resume a solid rate of growth, while maintaining a greater degree of economic stability and a better balance in the allocation of resources, particularly to basic industries, than has been achieved in the past. Overseas developments could damp our prosperity and growth, but we could be effectively insulated from any adverse influences by appropriate economic policy measures. The Federal Government's final responsibility for economic welfare, and the imminence of Federal elections, give the Government ample incentive to pursue such a policy. This was the conclusion of the three opening speakers, Mr. P. S. Shrapnel, Professor R. I. Downing and Dr. J. O. N. Perkins, who discussed the state of the economy at the meeting of the Economic Society's Victorian Branch on 28 March, 1958.

I

Mr. Shrapnel believed that, if internal economic conditions were the only factors to be considered, 1958 would be a good year. Wool prices were unlikely to suffer any significant further fall. Wool prices during 1958/9 might then be about 5 per cent lower than the average for 1957/8. In this case we must expect to lose about £50m. of our international reserves this year and a further £100m. in 1958/9.

The substantial loss of export income has been concentrated mainly on woolgrowers. However they were also the main gainers in last year's rise in export prices and had restrained their spending then in view of the threatened drought. This should moderate the net deflationary effect of lower export incomes.

The United States recession is already more serious than that of 1954. Industrial production in February was down 11 per cent on the previous February; gross private investment in the December quarter, 1957, was nearly 8 per cent lower than a year earlier; and unemployment reached 8·3 per cent in February, or 6·7 per cent if corrected for seasonal influences. What started as an inventory recession inspired by official deflationary policy, could be made more serious if businessmen and consumers carried out their intentions, as shown in recent surveys, to reduce investment and consumption expenditure.

The Administration has now, however, taken strong action to make more bank credit available at cheaper interest rates, to increase defence orders, to stimulate housing activity, and to extend unem-

ployment benefits; it is prepared to cut taxes if necessary. The imminence of elections provides an added spur for this action. While the United States economy may not recover as quickly as President Eisenhower has expected, the magnitude of the dip is not likely to become so great as to threaten a world slump.

The effects of an American slump would impinge on Australia mainly indirectly, through the United Kingdom and Western European economies. These have not yet suffered any serious adverse effects. There is some risk of a dollar shortage, and a consequent contraction of international trade, developing late in 1958.

In Australia, production figures show clear signs of strength. This should continue during 1958. The expansion of housing activity and buoyant hire purchase finance should in particular stimulate the production of consumers' durable goods. Bank debits for the seven months ending in January are 7·7 per cent above the figures for a year earlier and, for December and January, 5·3 per cent above. Retail trade figures are improving in all States, and particularly in Victoria; Queensland is lagging because of drought conditions and South Australia has not improved as much as her population expansion would justify. The rundown in retail stocks has ceased.

Total civil employment in the last year increased only 0·2 per cent, while population rose by 2·2 per cent. Queensland is the worst affected State. In January 1953, when there were 42,000 people on unemployment benefit in Australia, 7,000 of them were in Queensland; in January 1958, out of a total of 30,000 on benefit, 10,000 were in Queensland.

In 1953, unemployment was mainly among factory workers. Now it is spread, more thinly, among all workers. Much of it arises from drought conditions. Recent rains should bring some easing of unemployment during March and April. Thereafter, further improvement among rural workers will depend on Government measures to stimulate rural employment. Given success there, factory employment should expand satisfactorily.

Prices and wages are now nearly stable and should rise little over the next couple of years, though drought conditions will bring some short-term increases in food prices which may be difficult to reverse if they bring wage increases in their train.

In the field of capital investment, housing should expand significantly over the next twelve months. The Government and the banks are supporting the industry strongly. Commercial building, however, looks likely to continue to be rather slack after its rapid expansion of recent years. Motor vehicle registrations for the eight months ending February show cars up 5·3 per cent over the previous year and commercial vehicles up 17·8 per cent. Monetary conditions look like being easier with an easing of bank credit and a boom in hire-purchase finance.

Mr. Shrapnel concluded that during the next three months we should be able to get a clearer view of what was likely to happen in

overseas economies. Even if conditions deteriorated there, we should have enough warning to take evasive action here. The Federal Government will be particularly sensitive since any deterioration that might take place would be having its serious impact just about the time it will be facing the electors. The Government is likely therefore to give sympathetic consideration to measures such as reduced taxation on companies and individuals, depreciation concessions designed to stimulate private capital expenditure which is now the slackest area in the economy, and to an expanded Loan Council programme. It will also be affected in its decisions on monetary policy by the heavy loan conversions during 1958 and following years.

While the Government is evidently anxious to do nothing to force a resumption of inflation, it will probably be prepared to create credit if necessary to keep unemployment within politically tolerable bounds. At the moment then, while the next twelve months have their potential dangers, the probabilities are still fairly strongly in favour of a prosperous year. The prospects should be considerably clearer in a few months' time.

II

Professor Downing agreed generally with Mr. Shrapnel's view of the state of the economy. He thought that the latest production figures showed satisfactory increases, particularly in basic materials and fuels. Consumer expenditure on retail sales, new cars and durable goods was being well maintained. Bank credit and hire purchase conditions promised reasonable supplies of finance. Optimism on the stock exchanges and the sustained level of planned investment expenditures in the survey for the second half of 1957 suggested that business expectations were still healthy.

The prospect of a running-down of our international reserves over the next two years is not worrying. We have ample reserves in hand to stand the strain and we shall be using them for precisely the purpose for which they have been accumulated—to enable us to maintain imports in years when our export income is reduced by a fall in overseas prices or by drought conditions at home. The loss of £215m. of our reserves in 1954/5 and 1955/6 was much more worrying because, in those years, the main cause of the loss was excess imports due to domestic inflation. We are fortunate that, during 1956/7, the recovery of export prices and the control of imports combined to make good this earlier loss, leaving us in a sound position to face the recent check to export income.

There has certainly been a large absolute rise in unemployment over the last two years, and a disappointing check to the expansion of employment which had been rising by about 70,000 a year but over the last two years has risen in all by only 30,000. Moreover the seasonal reduction of unemployment that should have taken place in February was, in the event, disappointingly small. Current unemployment is largely seasonal, local (especially in New South Wales and Queensland)

and confined to unskilled workers. This suggests that, if any remedial measures are introduced at this stage, they should be special measures directed to these special aspects, rather than general measures affecting the whole economy.

Unemployment is still moderate in comparison with our work force, with overseas figures, and with our own pre-war experience. It is also moderate in comparison with the 3 per cent unemployment that economists, following Beveridge, have set as a reasonable maximum. When this figure was first suggested, there were widespread protests that no economy could work efficiently with such a small margin of unemployed. There were counter-accusations that the business community wanted a pool of unemployment. Businessmen denied this and now protest vociferously when the number on benefit gets to $\frac{1}{2}$ of 1 per cent of the work force.

There has in recent months been a certain degree of phoniness in the public discussions of unemployment. The complaints have come less from those most likely to be affected—the workers and their trade unions—than from those who expect to benefit from the easier credit, lower taxes and increased public works expenditures they prescribe as cures, and from those seeking any stick with which to beat the Federal Government.

We have not drifted into our present economic situation by accident. We have not only long hoped for stability but have introduced positive policy measures, in the credit squeeze of late 1955 and the tax and interest-rate changes of March 1956, to achieve it.

By stability, we mean a condition of full employment and stable prices. We must realize however that, if this is what we are aiming at, the best we can hope to achieve is a position that might be anywhere in what can best be described as a broad "twilight zone" between say 3 per cent unemployment and 3 per cent price increases. In that zone, there are likely to be forces operating simultaneously, some making for a worsening of inflation, some making for a worsening of unemployment. We are in that zone now and we hope to stay in it indefinitely. We therefore have to get used to the fact that it will always be difficult, as long as we are in that zone, to diagnose what is happening and in what direction the balance of economic force is likely to push us. In such a situation it is going to be difficult to get a sufficiently concerted public opinion to support any economic policy decision. In a bad recession or a bad inflation, it is easy to see what is happening and to get public support for attempting to reverse it by policy. In a state of fair balance, we must expect uncertainty and disagreement among experts and we can rely on no clear guidance from public opinion.

There is one point which it does seem important to raise at this stage. Some commentators have said that the present American recession is due essentially to the fact that the war and post-war backlog of private investment demand has finally been overtaken, that all important innovations have been incorporated in production processes and that the American economy is approaching saturation.

Whether or not this is true of the United States, it is certainly not true for Australia. Even if our growth stopped now, we would still have to make good large deficiencies in the capital equipment, particularly in the field of public investment, for our existing population. Still more do we have to do if we are to carry out our development plans for the future.

Professor Downing suggested that we can afford to spend less time worrying about our state of economic balance, and should concentrate rather on discussing what we most want to do and how we can best go about it.

For instance, our present immigration policy was laid down in the light of a 1945/6 view of our defence needs and security prospects. How does it measure up to a 1958 view of these factors? Defence apart, what level of immigration would contribute best to our sound economic development? Provided our long-term immigration policy is sound on strategic and economic considerations, and provided the Federal Government is pursuing an economic policy designed to secure the best use of all our resources, there is no case for short-term variations in our willingness to accept immigrants. On the other hand, when there is an easing of private demand for resources, if we are not prepared to step in and see that the released resources are used for urgently needed expenditures, then we should do better not to seek to attract immigrants to an economy where their production potential will not be used. In such circumstances, however, there will be a prompt reduction in the willingness of immigrants to come here.

We need also a better understanding of the role of public works and public utilities in economic development. Housing, power, transport and communications are the essential bases without which there can be no efficient expansion of industry. Without public discussion of this issue, leading to a reassessment of total requirements and a reordering of priorities among public works, can we be satisfied that the seventeen-year-old deficiencies in these fields are all inevitable? Recently, the Government has said that we cannot have a national roads plan because we have not enough money to finance it. This is not the issue. The issue is whether some resources now being used elsewhere might not be better employed improving our roads; and whether the impressive total of £80m. or £90m. currently being spent each year on roads is being used to the best advantage.

Again, if profitable opportunities exist, is it not possible for total investment expenditure in public works and private industry to rise above the 24 per cent of G.N.P. to which it has fallen in 1956/7? This requires a re-examination of the possibilities of economizing in expenditures on public services and defence, of reducing personal consumption by taxes and savings campaign, and of expanding the resources available to Australia by raising both our productivity and our overseas borrowing. Moreover, if we are and hope to remain in a near-equilibrium, we should be acting to replace import controls by less arbitrary

measures for restraining imports and by positive measures to expand exports.

If we were a fully developed economy, we could afford to be comfortable about our present state of economic balance. But our urgent need for capital expenditure inclined Professor Downing to the view that we should now go ahead energetically with a well-conceived programme for economic development.

He welcomed the recent decision to raise the Loan Council allocation for works and housing, not because he is worried about unemployment, but because we need the works this money will finance. He would welcome a decision to spend substantially more on housing, roads, power, transport and so on, not because of fear of a recession developing in 1958, but because our future comfort will be less if we do not undertake these expenditures now.

Similarly, he welcomed the Commonwealth Bank's recent announcements and acts indicating an easing of credit restrictions, because if business can thereby exploit profitable openings for investment which they would otherwise have been unable to finance, this will bring us increases in productivity which will quickly raise our living standards.

If we can secure a resumption of our economic growth without running beyond the limit set by our resources, so much the better—we shall be making good use of our available resources to get what we most want.

If a resumption of growth pushes us back into the inflationary side of our zone of balance, then we should try on the one hand to add to our total resources and, on the other, to restrain competing uses for resources. We can fairly count on a heavy pressure of public opinion to ensure that our current enjoyments are not cut too heavily in order to provide for future growth in our living standards.

But above all we should devote at least some serious thought to what we most want and how we can best get it, and less to whether we want ·5 or ·7 or ·9 of 1 per cent of our work force on unemployment benefit.

III

Dr. Perkins said certain features of the present economic situation —especially external ones—might cause difficulties for Australia. The continued growth in domestic economic indicators had of course to be deflated for population growth. Some of these indicators would then show a gentle decline.

He agreed with Mr. Shrapnel that the repercussions of the American slump were unlikely to affect Australia severely during 1958. But even if the American recession has now reached its worst point, the upturn is unlikely to start for several months. If the rest of the world feels the repercussions of economic trends in America only with a lag, we may be feeling the effects of their recession well into 1959.

The continued strength of the United Kingdom's balance of payments should enable the sterling area to avoid a serious crisis during 1958. But 1959 could be really difficult if, to the strain on reserves imposed by the aftermath of the American recession, were added an outflow of speculative capital from Britain inspired by investors' fears of a return of Labour to power in the forthcoming British election.

The United Kingdom is Australia's largest market and her economic condition is a crucial determinant of ours. Her current minor decline in activity, with overall unemployment at a level about the same as ours but particularly bad in certain areas, notably Northern Ireland, is likely to continue for most of this year. The recent reduction of the bank rate may indicate, despite official protestations that it is not to be regarded as a "green light" for the economy, that the British Government is now prepared to take some expansionary measures. It cannot want to see unempolyment rise appreciably higher.

Price inflation in Britain seems to have been checked at last, largely because of the considerable fall in price of many of Britain's principal imports of food and raw materials. Recently the prices of even some manufactured products in Britain have been reduced. This is true also of prices of some manufactures in the United States where, however, the general price level has continued to rise, despite the recession. The implications for Australia of these price trends overseas, especially in the light of the general downward trend of world prices of primary commodities over the last year or so, is that the objective of mere stability in our price level here may not be enough. If we are to avoid balance of payments difficulties, it may be necessary for domestic prices in Australia to fall somewhat if we are to avoid a depreciation of the exchange rate.

Our consideration of economic policy for the next year or two must take into account the present and prospective downward trend in world trade as a whole. Unless some wholly unforeseen favourable events occur later this year, 1958 will see a reduction in the value, and even the volume, of world trade for the first time since 1953. This seems inevitable with the recession in world commodity prices, and the general decline in activity in most industrial economies which this time coincide with the recession in America, in contrast with 1953/4 when European economies were booming.

Imports have already been cut severely from the very high levels of 1957 in several countries, usually involving a reduction in those countries' projected rates of economic development. These countries' international reserves have declined sharply over the last year or two and in some cases, for instance in India, Pakistan and Malaya, are uncomfortably low for the first time since the war.

Indeed a general decline in international liquidity has overhung the whole outlook for the world economy over the last year or so. The relief given over the past year by borrowing from the International Monetary Fund will cease while those loans are being repaid in the next two or three years. Of the major trading nations, probably only

the United States, Canada, Western Germany and Australia have at present a level of international reserves that is not causing them anxiety. In this situation, even a minor deterioration in the accounts of the rest of the world with the dollar area could have serious repercussions, leading, in all probability, to a widespread cutting of imports and a downward spiral of world trade unless measures are taken in advance to prevent it.

It is understandable then that Australia should exercise caution about increasing her imports and making further withdrawls from her international reserves. But we could, if we chose, make a valuable contribution to maintaining the level of world trade, since our reserves are high enough to afford some expansionary action. Our remaining import controls, which we could offer to remove, and the importance of our market to Britain gives us a useful bargaining position in any discussions aimed at raising or maintaining the level of world trade.

The decisions of economic policy taken by the major trading nations during 1958 may have an unusually great effect upon the level of world trade in the next few years. For one thing, these policy decisions will determine whether world trade enters a period of stagnation or decline after this year's expected fall in its value and volume, or whether it will recover quickly. Secondly and more important, the current negotiations about the European Free Trade area and the Commonwealth Economic Conference in September are likely to see decisions taken that will be a powerful influence for contraction or for expansion of world trade. The current negotiations for grafting a wider area of freer trade in Europe upon the European Common Market, which is due to begin tariff reductions in January 1959, are in danger of foundering on French opposition based on protectionist sentiment. One condition the French Government is said to have requested in return for its support for the Free Trade Area is a freer access to Commonwealth markets. Clearly the Commonwealth countries will have to consider whether this would be worth offering—and only Britain could lose by it—if it is necessary in order to prevent the splitting up of Europe into two partially exclusive trading blocks.

If the efforts to form a Free Trade Area do founder, the Commonwealth countries, coupled perhaps with those in Europe outside the Common Market, will have to decide whether or not this will necessitate their forming some sort of tight trading club. In view of the urgent necessity to take measures to maintain or raise the level of world trade, it would be unfortunate to wait until the prospects of forming a Free Trade Area in Europe fade almost completely away and then go off to Ottawa to set up an alternative and partially competitive system. It would be far better if the Commonwealth countries at once expressed their intention of taking decisive measures to maintain the level of international trade among themselves and with any others who will join them. This might well have the effect of making the Common Market countries, including France, eager to jump on the bandwaggon, and thus have the decisive effect of saving the project

for a European Free Trade area. The sterling countries could show the way by setting up a fund of temporary short-term liquidity to help members whose reserves are low to increase their imports; and supporting a new and larger scheme of aid to their underdeveloped members. Britain is already seeking ways of expanding her exports as an expansionary measure to meet her own current situation. As with her suggestion of the Colombo Plan, Australia would be in an especially favourable position to initiate such a move. She has no axe to grind in the matter, although she has as much to gain as any country from measures that would help to maintain world trade, and she could make a very worthwhile contribution to that end.

THE SHAPE OF THE AUSTRALIAN ECONOMY, 1861–1900[1]

Facts are dull and they reach their nadir in statistics. Indeed, one of the more amusing features of historical-statistical investigation is the fact that errors and inaccuracies of statistics over long periods may easily lead one into figments of statistical imagination, not real historical phenomena. The reorientation of approach to Australian economic history of the period 1861–1900, suggested in this paper, is based on the attached estimates of Australian national product,[2] my published estimates of capital formation[3] and some supplementary knowledge. The suggestions must, obviously, depend on supporting—or amending—evidence, statistical and literary. It should be stressed that my estimates of national product are preliminary and one can draw only tentative conclusions from them. For the moment, I propose to suggest only a number of basic points, inferences from statistics, in an attempt to describe the main features of the shape of the Australian economy.

If I disagree with his interpretation, on almost all its fundamental points, I should first acknowledge the debt which probably all of us who have worked in Australian economic history owe to stimulus from and irritation by Brian Fitzpatrick. For the second half of the nineteenth century, his *British Empire* has provided and will continue to provide an essential jumping off point for historians, economic and otherwise. This book still serves, I think, to define an underlying conception of Australian economic history in the minds, say, of recent graduates, even if not in those of more advanced practitioners. At the risk of injustice, this conception should be summarized.

Fitzpatrick was well aware[4] that his account was defective and in particular did not give us a very clear impression of the scale, rate of growth, stability or direction of Australian economic expansion. In his interpretation, the decline of gold production after 1860 left the pastoral industry to resume the centre of the Australian stage, and to lead the expansion until the depression of the 'nineties. This expansion was achieved through the spread of labour-saving innovations in the

1. This paper was read to a conference of historians arranged during 1957 by Professor Sir Keith Hancock at the Australian National University, Canberra. Although some of the propositions may need to be qualified or spelled out, I have preferred to leave the paper substantially as delivered, in order to avoid complicating the argument. For the same reason, footnote references have been reduced to the minimum. I have to acknowledge the assistance of Mr. G. Pursell and of Ruth Inall in the preparation of statistical material.

2. The estimates of national product are being prepared in detail for publication in a forthcoming book; I present them, therefore, without comment.

3. *Public Capital Formation in Australia, Estimates 1860–1900,* A.N.U. Social Sciences Monograph No. 2, and *Private Capital Formation in Australia, Estimates 1861–1900,* A.N.U. Social Sciences Monograph No. 5.

4. See, in particular, the discussion in *The British Empire in Australia* at pp. xxiv-xxxii.

pastoral industry and took Australia into leadership in world markets. A slow and uncertain growth in agriculture (with a background of land legislation), a decline in gold and steady rise in non-auriferous mining complete the range of job opportunities offered by historians to the rapidly growing Australian population. For the rest, we are given to understand that manufacturing grew very slowly and was of little account; and the building industry is passed over in silence. Attention is concentrated almost entirely on export markets and export industries. Apart from a fleeting reference to railways neither transport problems nor public action (other than that hardy annual, tariff policy) figure significantly, even though, in some ways, public and private action were "mutually indispensable". A vague association of British capital with expansion completes the understanding of the process of growth which continued until "the depression of the 'nineties". This depression, a resounding series of "bank crashes" (Fitzpatrick's version is little advance on that of Shann) was the product of urban speculation, withdrawal of British capital and fall in wool prices.

The following reappraisal is suggested:

I. *During the thirty years 1861–90, Australian economic growth as a whole was sustained, stable and rapid. This agrees with convention, but more precision can be given on the scale, rate and stability of growth.*

The estimates of Australian national product fit well the existing belief in a strong and remarkably well-sustained process of expansion over the thirty years after 1860. This was, indeed, a "generation during which children grew to middle age without personal experience of economic depression".[5]

Movements in the aggregate were a little uncertain during the 'sixties, with some tendency to recession in 1867. Between 1870 and 1890, two and possibly three minor recessions occurred. We might identify a mild downturn, usually reported as concentrated in the towns, in 1871. The estimates suggest a fall of only 1 per cent in net national product. In the second half of the 'seventies, another setback occurred; the fact is well known, though there may be some dispute about its timing and severity. Most plausibly, the years 1878–9 might be treated as an occasion when net national product failed to expand (beware the attached series!) leaving unemployment to accumulate. For special reasons of immigration and age composition, unemployment may have been on a scale considerably higher than would otherwise be expected. Finally, in 1885–6, net national product fell about three per cent in two years. Again this minor recession may have produced substantial unemployment because population continued to grow rapidly.

None of these recessions can match the depth and duration of the depression which followed the check to growth in 1889 and occurred in the course of the actual downswing during 1891–4. Then, net national

5. Fitzpatrick, *op. cit.*

product fell by about 30 per cent, a collapse on a scale to be matched only in the nineteen-thirties (or eighteen-forties??). Recovery was halting, deferred in 1896-7 under the impact of drought. But, in contrast with the usual understanding, once it had begun properly, recovery was speedy and remarkably complete—in the aggregate. By 1900, net national output had pretty well regained its peak level of 1889–91.

When we turn to the scale of expansion and the rate of growth, we are, effectively, on new ground. The estimates suggest a very substantial expansion of the economy, with net national product rising from about £60 millions in 1861 to about £200 millions in 1900—an increase of about 250 per cent in forty years. The scale of expansion is, however, distorted by price movements. I have adjusted gross national product in a very preliminary way, suggesting an even greater real growth. Gross national product rose, on this calculation, from about £50 millions in 1861 (at 1900 prices) to somewhat more than £200 millions—an increase of a little better than 300 per cent in forty years.

The really striking feature of this period is, however, the speed of growth. Measurement of rates of growth are affected not only by price movements but also by the break in 1889–91 (I disregard, here, the index number problem!). Taking the whole forty years, and using a convenient averaging system, gross national product in 1900 prices rose, on an average, at about 4½ per cent per annum.[6] If we use only the first thirty years, this rate rises, on the same basis, to a little over 5 per cent per annum.

These facts are not very meaningful in isolation. They imply a rate of growth very much faster than is suggested by the trade statistics which have sometimes been used. Later we will see some substantial reasons for preferring the implications of the national product estimates. Greater meaning can, perhaps, be given by ranking Australia with a group of other fast-growing countries. Taking five countries of Western Europe and North America, and using the longest run of national product estimates available in each case, Australia emerges among the front rank of leaders in growth over this period. The evidence is by no means conclusive and the procedure open to methodological argument. But the data suggest the following order: the United States grew most rapidly, at about 5½ per cent per annum; Australia followed second at about 4½ per cent per annum; in third place, Canada and Germany ran neck-and-neck at about 4 per cent per annum; more sedately, Britain followed the field in fifth place at about 3 per cent per annum; and France dawdled behind, last, at about 1½ per cent per annum.[7]

6. In order to facilitate a large number of calculations to permit international comparisons, I have estimated average rates of change by averaging percentage rates of change in overlapping decade averages. This is merely to conform to Professor Kuznets' calculations in other countries.

7. See footnote 6.

II. *The process of Australian growth rested on rapidly rising population and a fast-rising stock of capital equipment. In both cases, Australian expansion depended on inflow from abroad, chiefly from Britain.*

Throughout these forty years, Australian population grew rapidly, adding to the human resources acquired during the gold decade. Between 1861 and 1900, population rose at a fairly steady rate between 3½ per cent and 4 per cent per annum. There were some fluctuations in this rate of growth, first in the more rapid addition particularly in the mid-seventies and first few years of the 'eighties, as a result of a burst of immigration, and later, in the 'nineties, due to net emigration during the depression. Part of the speed of growth was due to a high rate of natural increase, part to immigration. In fact, between 1861 and 1885, somewhat less than half the annual addition to population in each year was due to immigration, the rest to natural increase. Of these migrants, virtually all came from Britain, including Ireland.

This was a high rate of increase. Its speed can be tested by reverting to international comparison with our five foreign countries. Of this group, Australia led in rates of growth in population. In the United States, population growth averaged about 2½ per cent per annum; in Canada, Germany and the United Kingdom, population grew at a rate between 1 per cent and 1½ per cent per annum; while French population hardly increased at all.[8]

This population combined with a rising stock of capital equipment, the product of a sustained and increasing investment expenditure over the years between 1861 and 1889. Australian new domestic capital formation increased very slowly during the 'sixties. Nevertheless, it attained, even at this period, the respectable level of about 10 per cent of net national product. It was from the beginning of the 'seventies that growth of capital equipment speeded up, when investment rose quickly to absorb about 20 per cent of net national product. This was a very high proportion. It matches almost exactly the share of American national product diverted, over these years, to capital formation and it was about double the share of domestic capital formation in British national product.[9] This proportion was maintained until the end of the 'eighties. During the depression which followed, new capital formation fell drastically, to reach a mere 5 per cent of net national product during the drought of 1897. This represented a catastrophic fall in the course of which a large amount of surplus capacity was worked off while population continued to grow.

In the expansion of capital equipment, financing of investment depended heavily on foreign supplies of funds. Capital imports between 1871 and 1890 accounted for half to two-thirds of new capital formation, leaving Australian savings to provide the minor part. This

8. See footnote 6.

9. *Kuznets,* "Quantitative Aspects of the Economic Growth of Nations. I: Levels and Variability of Rates of Growth". Published in *Economic Development and Cultural Change,* Vol. V, No. 1, October 1956.

supply of funds seems to have borne comparatively little connection with the course of events in the British economy and only a limited connection with over-all short-term movements in British foreign investment. If this is a correct picture, it helps to explain something of the stability of the Australian economy in the 'seventies and 'eighties. The willingness of British investors to supply increasing amounts of capital to Australia freed the economy from overseas fluctuations. But it created a financial dependence which, in the end, was felt when monetary pressure contributed to the cessation of growth and the downswing of 1891–4.

The table below gives some indication of the scale of this dependence:

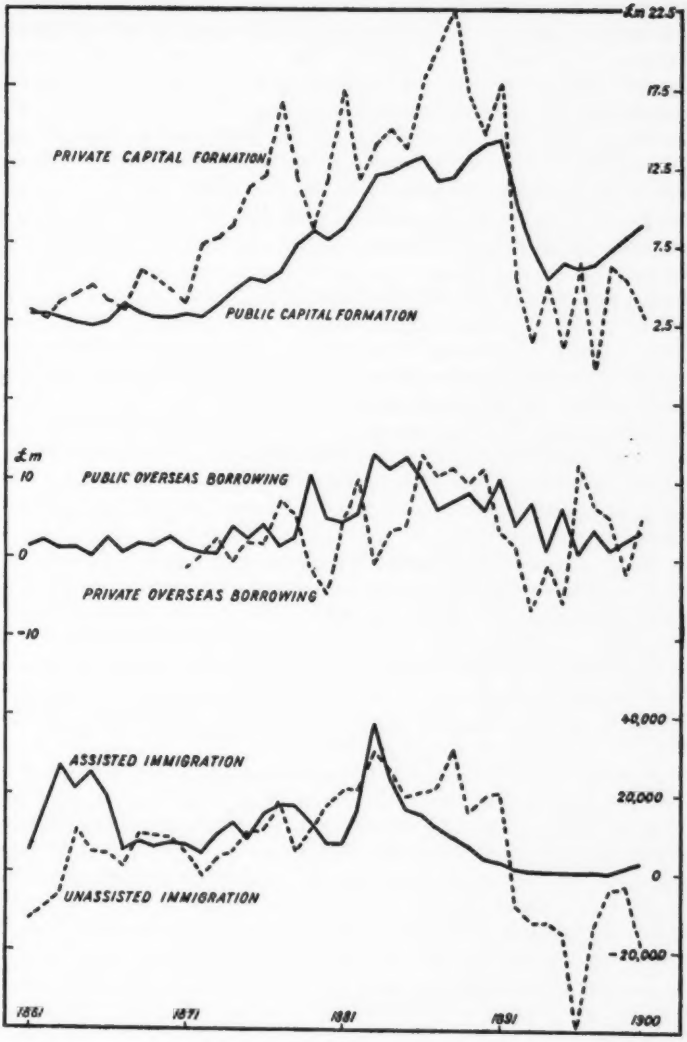
Population, Migration, Capital Imports and Investment

	New Cap. Form.	Cap. Imps.	Pop. Increase	Net Immig.
	£'000	£'000	'000	'000
1865	7,128	—	64	30
1866	6,446	—	53	23
1867	7,032	—	39	7
1868	8,962	—	55	17
1869	8,351	—	52	15
1870	7,368	—	55	16
1871	6,572	–2	52	12
1872	10,450	756	42	33
1873	11,568	2,894	52	12
1874	13,304	3,781	54	17
1875	16,619	4,875	48	18
1876	17,072	6,264	60	25
1877	22,255	8,769	72	34
1878	19,454	8,160	61	22
1879	17,117	8,896	70	25
1880	19,950	4,191	69	24
1881	25,763	8,807	75	29
1882	21,934	16,292	80	38
1883	25,724	13,705	117	69
1884	27,338	16,114	99	50
1885	26,517	17,669	86	35
1886	31,203	24,577	89	35
1887	31,816	18,098	90	31
1888	34,478	20,085	100	40
1889	30,472	19,624	79	22
1890	28,574	17,510	86	23
1891	32,268	15,133	85	23
1892	15,745	7,519	59	–8
1893	8,993	942	50	–13

III. *This population and capital inflow was channelled into two sectors, roughly of equal size, government and private enterprise. Between them, the institutions of these two sectors provided for the growth of Australian capital equipment, sharing expenditure about equally.*

The graph opposite indicates clearly enough the similarity in size of the public and private sector, in terms of immigration, capital inflow and capital formation.

Various devices for assisting immigration were adopted in the different colonies. Public policy was strongest in Queensland, N.S.W.


£m 22.5
17.5
12.5
7.5
2.5
PRIVATE CAPITAL FORMATION
PUBLIC CAPITAL FORMATION
£m
10
0
-10
PUBLIC OVERSEAS BORROWING
PRIVATE OVERSEAS BORROWING
40,000
20,000
0
-20,000
ASSISTED IMMIGRATION
UNASSISTED IMMIGRATION
1861
1871
1881
1891
1900

and South Australia. Assistance remained important until the mid-eighties when, after an exceptional intake in the early 'eighties, assisted immigration dwindled away. For the remainder of the 'eighties, migrants were left to arrive at their own expense. The equality of numbers of assisted and unassisted migrants did not, of course, mean that similar numbers flowed into government and private projects. What is implied is that the two groups were influenced by different motives and inducements and, probably, formed two different economic sections. It is possible that some of this difference is reflected in the relationships between private capital formation and unassisted migration.

On the other hand, the fact that the private and public sectors each borrowed overseas at much the same rate did imply, in the long-run, that these funds flowed into public and private investment sectors at much the same rates. But, as the graph suggests, the import of capital in both cases was extremely unstable. The stability which emerges in aggregate Australian borrowing overseas is to be explained by the persistent short-term inverse relationships between the public and private borrowing. These inverse connections contributed to a stabilization also of total Australian capital formation (see my *Colonial Socialism in Australia*[10]).

In the expenditure of these funds, the two sectors behaved differently. Public capital formation was relatively very stable; private capital formation relatively unstable. The weight and stability of government capital expenditure had, therefore a strong stabilising influence on the expanding economy. But, in addition, public and private capital formation tended to move inversely with each other, even if less strikingly than in the case of capital imports. This added a further stabilising influence to the expansion.

It would follow that the behaviour of government has been grossly underestimated and government contribution to economic growth been seriously misinterpreted by the conventional attention to the relatively insignificant tariff policy and land legislation. Not only is more research needed on the process of government expenditure and the growth of transport equipment but serious attention should be given to leading officials. If Australia lacks the colourful Zimmermans or Flemings, the Raes, Whittons and Speights are still worth attention.

On the other hand, the general institutional influences on the aggregate level of private investment are unknown. It is worth raising one central issue. A connection appears to exist between the London funds of banks operating in Australia and the level of private investment. This connection is too consistent and close to be casual. It would suggest that banks, which undoubtedly occupied a key role in receiving not only most of the private capital imports but also a considerable part of government cash balances and in lending to private enterprise

10. In the press. Presented to United States Social Sciences Research Council Committee on Economic Growth, Conference on the State and Economic Growth, New York, 1956.

on mortgage may have geared private investment expenditure to the movements in their liquid assets in London.[11]

IV. *Domestic capital formation, channelled in this way, was concentrated in four main paths, residential building, pastoral equipment, railways and local authority works. In these conditions, investment decision-making tended to be influenced by long-term considerations, rather than short-run profitability.*

In view of the silence, in the literature, on the building industry, it may be surprising to find that residential building was the most important field of investment throughout most of the period. In fact, residential building led the rest except for the few years during 1874-81. It was only during the very big pastoral expansion of the 'seventies, when large-scale fencing and speculative equipment of pastoral stations were undertaken, that pastoral equipment assumed leadership. Apart from these few years, pastoral equipment and railways vied for second place until the depression when railways forged ahead. In very general terms, residential building absorbed about one-third of all resources going into capital formation. Pastoral equipment was a much less stable component, fluctuating between 10 per cent and 30 per cent; and railways varied between 10 per cent and 20 per cent.

Apart from these, local authority works, chiefly roads and waterworks, were much more important than we have been led to believe, contributing 5–10 per cent of total new capital formation until 1890 and, during the 'nineties, actually accounting for as much as 40 per cent of total investment. Not only has local government been underestimated, but one other item of investment is worth noting for its relatively good showing—manufacturing. We will come back to this later.

A number of points of considerable importance emerge from these relative shares in investment. First, a very high proportion of total capital formation took the form of works requiring the effort of unskilled labour. Except for railways, only primitive equipment was needed in the main fields; and in all four main components, a comparatively modest input of materials was required. Railways, fences, tanks and dams and even many buildings were either mainly earthworks or relied on local on-the-spot materials. This implied that the task of financing capital formation meant primarily the feeding of an army of unskilled labourers, without imposing great pressure on imports by way of imported materials.[12] Secondly, in all four leading components, short-term profit considerations were of limited importance. Public investment revolved around long-term social and economic

11. This is, of course, the result to be expected in a gold standard situation. What is interesting—and comforting—is that my statistics actually conform to theoretical expectations!

12. Since writing this, further work on the building industry indicates that imports on account of house building may have been a substantial and steadily increasing proportion of new residential investment. This does not affect greatly the aggregate conclusion, but could be a serious qualification in this particular segment.

policy, without great regard for short-term economic conditions. Housing, primarily for home-owners or would-be owners, was forced to bow to short-term considerations mainly under the influence of financial policy, usually operating via the banks on building societies. Pastoralists, intent on the building up of rural estates were often unable to predict or even discover the profitability of capital outlays. On the one hand, this long-term element in decision-making probably contributed to stability; on the other hand emphasis on the long-run led to the development of flagrant excess capacity. A third implication lies in the job-opportunities arising in these works. If pastoral investment did not absorb the greater part, and if building did, we have to look outside the rural economy for the centre of expansion. This point will be taken up fully later on.

V. *This growth of domestic assets brought a very substantial reduction in the importance of export incomes in the economy and hence of overseas market considerations.*

This point, which is so much in conflict with the usual accounts, needs little comment. Although the volume of exports expanded faster than the value of exports, overseas exports in current values accounted for a very variable proportion of national product. Throughout the long expansion, there was a very marked fall in the proportion which changed from about 30 per cent in 1861 to a mere 12½ per cent in 1887. From this low position, a recovery occurred, the main movement dated from 1891. This rising share during the 'nineties was due almost entirely to falling national product. Export incomes hardly altered at all during the slump and the whole weight of the 'nineties depression was, in fact, thrown on domestic activity.

On the other side, imports from overseas fell heavily in importance in relation to national product, and continued to fall throughout almost the whole forty years. This decline was, admittedly, an unsteady one, but reduced the proportion of imports to national product from 30 per cent in 1861 to about 15 per cent at the end of the 'nineties. Unlike exports, the level of imports fell heavily during the depression of 1891–4, indicative of the degree to which British savings had, until 1890, underwritten standards of Australian consumption and domestic capital formation.

VI. *Until the final decade, primary production expanded, but less rapidly than the rest of the economy. The pastoral industry grew quickly for the first fifteen years only, and thereafter fell behind. It was not until the depression that the relative importance of primary output rose again, the result as much of decline in the rest of the economy as of expansion of the rural economy.*

The share of primary production in net national product fell from 40 per cent of net national product in 1861 (a position maintained until 1875) down to 30 per cent in 1888. Much of this decline was due

to the subsidence of gold-mining, the fall in which was not offset by non-auriferous mining. The share of mining as a whole in net national product declined from the exceptional level of 15 per cent in 1861 to about 5 per cent by the mid-seventies, a level which was maintained until the close of the 'eighties. In addition, agriculture failed to offset the decline in mining. In fact, farm production contributed an extremely steady share of national output through the century, hardly deviating from about 10 per cent of national product.

The most important influence affecting the contribution of the rural economy was, however, the behaviour of the pastoral industry. From 1861 until the mid-seventies, the pastoral industry behaved in conformity with the textbooks. Its share of national output rose from about 10 per cent in 1861 to about 20 per cent in 1874, possibly the largest share which it ever attained. But this performance was not sustained, even though my method of estimating pastoral output, with the inclusion of flocks, adds greatly to the total output of the industry. Although the volume of pastoral production continued to grow after 1874, the value of output failed to increase significantly and the share in national output wavered during the 'eighties between 10 per cent and 15 per cent. A burst of expansion at the end of the 'eighties did briefly restore its position, only to be followed by the long decline of the 'nineties. By 1900, its share in national output had fallen to almost exactly the same level as in 1861.

This evidence suggests a revision in the importance attached to the pastoral industry *as a contributor to national output*. It may also imply a revision, an increasing complexity of the story of pastoral growth, in terms of a performance in productivity which does not fit the usual story. Pastoral expansion during the first fifteen years was concentrated in established areas; increasingly between 1875 and 1890, pastoral output rose as a result of extension to poorer land. Technological innovations assisted expansion mainly by permitting this spread to marginal areas and encouraged the emergence of excess capacity with which the 'nineties were to be so seriously plagued.

The fall in output of the pastoral industry in the 'nineties is an indication of the reduction in pastoral capacity. But this decline led to the establishment of a "new" export industry, refrigerated meat export, which helped to pave the way to recovery and eventual diversification of the rural economy and of Australian exports. In addition to this side to rural recovery, mining also expanded greatly in the 'nineties, chiefly the result of Western Australian gold.

VII. *Leadership in expansion centred, not in the primary industries, but in manufacturing, the building industry, railway transport and personal service.*

The estimates suggest that the place of secondary industry generally, and its role in expansion, was quite different from that suggested by existing literature. Far from occupying a small and slowly

growing corner of the Australian economy, secondary industry rose from about 10 per cent of national product in 1861 to about 25 per cent by 1881. It maintained that share until the downswing after 1891 forced a drastic curtailment of output.

To some extent, the explanation of this rising share is due to the development of building activity. This reflects, but only partially, the rising expenditure on capital formation in the economy. Certainly it was the building industry which accounted for the main fluctuations in the relative importance of the secondary sector; and, in particular, it was the building industry which suffered the catastrophic and prolonged collapse in the 'nineties.

But it was not in the building industry that the really outstanding growth occurred. Manufacturing was, over most of the period, by far the fastest-growing segment of the Australian economy. Its share in net national product rose from less than 5 per cent in 1861 until it attained the level of between 12½ per cent and 15 per cent in 1881. From this point, its rate of growth tapered off until, for the rest of the century, it more or less kept pace with the rate of growth of the whole economy. This was true even in the slump and recovery of the 'nineties. Not only do we need to reconsider the role of manufacturing in the long-run expansion; we need also to look to it as a source of recovery at the end of the century.[13]

The behaviour of railway transport need occasion no surprise. It began, effectively, from zero in 1861. Nevertheless, it rose to account for a significant share of net national output, an indication of the major obstacle which distance posed in Australian economic development.

Manufacturing rose, on these estimates, by 1,000 per cent; building by 500 per cent. The other fast-growing segment outside primary and secondary production was personal service. Tertiary services as a whole contributed a highly stable share of national product until the late 'eighties, contributing about 35 per cent over the first 30 years. The rise in the share occurred in the late 'eighties, partly due to an expanding public service, partly to rising importance of personal service. Until the closing years of the 'eighties, personal service, including domestic service and professional earnings, remained fairly constant at about 10 per cent of national product. But in the final phase of growth, this share rose fairly quickly. It is not accidental that this increase was matched by increasing public service earnings, for the constancy and subsequent rise in personal service are due mainly to steadily rising professional earnings. These professional services were not unrelated to government services, and both were tied, mainly, to urbanization. It is interesting to find that domestic service tended to lose ground throughout the whole period.

13. The significance of industrial growth as a *sine qua non* of economic development has not been adequately incorporated in Australian literature. It would seem axiomatic that a substantial industrial reorientation must have occurred: rapid population growth, decline in mining and limited employment opportunities in rural activities.

VIII. *Australian economic development is mainly a story of urbanization. The building of cities absorbed the greater part of Australian resources diverted to developmental purposes; the operation of enterprises in the towns employed most of the increasing population engaged in work.*

The detailed information in the preceding section simply reflects the rapidly rising importance of urban society. The absence of discussion, in the literature, on the building industry, the disparagement of manufacturing, and the neglect of tertiary occupations merely reflect the failure to incorporate the rise of the cities in the story of Australian economic growth. It might be added that the conventional descriptions, in the general history books, of "the pastoral ascendancy" as the theme for the social history of Australia over this period stem from similar misunderstanding by social historians.

The scale and speed of urban growth can be indicated in a number of ways. First, we may cite the urban concentration of population in N.S.W. In the thirty years between 1861 and 1890, the urban-rural distribution was changed from rough equality between urban and rural population to a position in which the urban population was twice that of the country areas.

N.S.W. Population[14]

	1861	1871	1881	1891
Urban	159,800	234,800	426,900	730,000
Rural	189,100	266,800	321,300	388,200

Whereas, the urban population between 1871 and 1891 approximately doubled in each decade, the rural population increased by less than 50 per cent in the whole twenty years.

In the case of Victoria, a different illustration is useful, to indicate approximately the scale on which developmental resources were diverted to the building of Melbourne during the twenty years 1871–90. We should add a caution that the picture is not quite so striking in N.S.W. and still less so in Queensland, but this is due to the fact that non-metropolitan towns were much more important there than in Victoria.

It should be noted that we have included only three components of private capital formation, compared with all components for Victoria. This table understates the importance of Melbourne.

These facts merely conform to the picture of changing Australian output already presented. It was into the towns that the rapidly growing population went; it was in the towns that most private capital equipment was installed; it was in the towns that manufacturing expanded; it was in the towns that tertiary services increased; it was in the towns that the building industry grew; and, even in the case of railways, services connected towns rather than served the freight needs of the country areas.

14. Data from N.S.W. *Censuses.*

Private Capital Formation in Melbourne, 1871–90[15]

(£'000)

Date	Industrial (Melb.)	Residential (Melb.)	Commercial (Melb.)	Total Melb. Private Cap. Formation	Melb./ Vic. %
1871	–21	256	—	235	17
1872	117	1169	261	1547	53
1873	214	988	31	1233	37
1874	592	595	190	1377	49
1875	499	657	–6	1156	30
1876	334	723	–91	1057	32
1877	452	642	–114	642	17
1878	571	526	19	1116	84
1879	208	782	140	1130	38
1880	163	700	246	1109	46
1881	163	874	417	1454	49
1882	398	888	831	2117	56
1883	66	1084	–37	1150	35
1884	597	1817	–202	2414	65
1885	33	2378	748	3485	56
1886	316	2704	1202	4222	61
1887	645	778	1197	2620	36
1888	890	3023	2211	6124	74
1889	–547	4436	–13	3889	80
1890	1139	978	470	2587	60

IX. *Although national output rose rapidly, it seems barely to have kept pace with population. This would imply hardly any improvement in real product per head as a result of expansion. This result is consistent with the process of urban concentration.*

Comparisons over time always run foul of the index number problem. For much the same reason, international comparisons of rates of change in national product per head are even more suspect. Moreover, estimates of output per head require an extremely high order of accuracy in statistics. Despite these difficulties, a comparison can be suggested in available data which, however suspect, seems worth serious attention. Reverting to the countries of Western Europe and North America, we found before that Australian population growth was the fastest of the group and that aggregate national product in Australia rose at the second most rapid pace. Combining these two facts, we emerge with a new comparison and an entirely different ranking. Canada, the United States and Germany appear to have made the greatest gains in real output per head, with rates of growth of about 2½ per cent per annum. Not far behind, but definitely in fourth place, British output per head rose at somewhat better than 1½ per cent per annum. France was hot on Britain's heels, with a shade under 1½ per cent per annum. A rank outsider, Australia eventually came home at the snail's pace of 0·2 per cent per annum—scarcely worth starting.

To those accustomed to treating the pastoral industry as the centre of the Australian stage, the question raised in this contrast is not easy to handle. The pastoral industry, with its rapidly improving technique

15. Table prepared from data collected for my monographs on capital formation.

appears to be a model of increasing productivity and source of rising living standards. (Even if export prices fell, import prices moved in the same way and at a similar rate.) To explain a barely perceptible improvement in standards of living, two things at least must be done. First is required a much more complex story of the pastoral industry; secondly we need to investigate the development of urban activity, perhaps to find, not a failure of performance, but possibly a quite remarkable achievement—the absorption into urban society in a new country of a population increasing at high speed, without significant loss in living standards; and a remarkably successful reorientation towards industrial activity.

In this story, the middle of the 'seventies seems to be critical. So far as the pastoral industry goes, this was the time when output was extending rapidly to less efficient land; and there may have been a decline in soil fertility in older areas, particularly those in which sheep and agriculture were combined. Before the mid-seventies, the concentration of investment was on established properties and in relatively good areas. Moreover, taking N.S.W. data as a guide, it is in the course of the 'seventies that urban population began to assume definite leadership. In the growing trend to the cities, the actual building of the cities is unlikely to have contributed to increasing output per head: this was a notoriously inefficient industry and poorly equipped. Neither manufacturing nor personal service is likely to have lent itself to substantial improvements in productivity.

X. *With stable employment, slowly falling prices, and rising real wages, Australian wage-earners were in a strong position to seek gains in the form of increased leisure and were preoccupied with preserving rather than improving wage standards until 1890.*

During the thirty years 1860 to 1890, a powerful trade union organization in both the urban and rural sectors was established, accompanied by the growth of collective bargaining. Union bargaining was concerned with three main issues, union recognition, wage rates and hours of work. Although with the onset of crisis in 1889, union recognition or its rejection became crucial, the prime objective of unionists for most of the preceding thirty (or forty) years was the reduction of hours of work, by means of collective agreements. The depression of the 'nineties reversed all the achievements: union organization crumbled, collective agreements were discarded and the ground laid for the growth of arbitration in labour relations.

There is no novelty in this conclusion. What is important, however, is to attempt to establish the rationale behind union policy and wage experience. Intrinsically, in a rapidly growing economy, with an increasing proportion of resources diverted to the formation of capital equipment with a long gestation period, one might expect prices to rise and real wages to fall. In practice, however, Australian domestic expansion occurred within a context of falling world prices, affecting both imports and exports. Exposed to the deflationary pressure of imports

whose prices were falling, Australian domestic prices showed a slight tendency to decline. Meanwhile, a rapidly growing labour force was confronted with a rising demand for labour, leading to slowly rising money wage rates. The increase in real wages which occurred was as much due to falling domestic prices as to rising money wage rates. Moreover, a large part of the increasing demand for labour stemmed from rising investment expenditures which were, in turn, financed by British capital. The behaviour of trade unionists and the movements in real wages depended, basically, on the extent to which British capital underwrote Australian wage standards during a period of massive investment; and the extent to which falling world prices placed a further check on domestic Australian price movements. It would seem that wage rates rose sufficiently to offset the fall in hours of work.

XI. *The course of expansion was accompanied by a number of elements of growing instability. The usual explanations of the depression of the 'nineties, chiefly in terms of external events, are unsatisfactory.*

The end of Melbourne speculation, the withdrawal of British funds and a fall in wool prices are usually taken as the signal for the depression of the 'nineties. All these undoubtedly played a part, though possibly in a different way from the usual story. I do not propose to attempt, in any way, an interpretation of a very complicated event. But a few points are worth noting. First, it is hard to date the depression as beginning in the 'nineties, without taking into account the fact that private investment began to fall in 1889, two years earlier. This may reflect on the interpretation of the role of the Baring crisis which may have affected public rather than private investment and might not have been the major influence generally believed. Secondly, it is doubtful if export price movements, at the particular time in 1891, really dominated the situation. For one thing, it seems that export earnings scarcely fell at all in the course of the slump. The whole weight of the depression was put on domestic activity and imports. In fact, there is a good deal of evidence to suggest that, well before 1891, the pastoral industry was in serious difficulty and that these difficulties were coming rapidly to a head, for no reason associated with the overseas market situation. First, capacity had been increasing rapidly in the course of the 'eighties, as large numbers of would-be pastoralists entered the industry in marginal western lands. The construction of a million and a half miles of station fencing in N.S.W. alone during the 'eighties, along with associated station equipment created an untenable position. Secondly, stations in increasing numbers were becoming heavily in debt, particularly in marginal areas. During the second half of the 'eighties, these debts had in many cases risen to absurd heights. Thirdly, by the mid-eighties, it is clear that a high proportion of stations was unable to meet interest commitments; many pastoralists continued to operate stations only on the goodwill of financial enterprises and only so long as finance houses were prepared to allow

pastoralists to go on compounding current losses and unpaid interest in capital debts. Finally, though the pastoral industry was probably least affected by this, wages were rising to eat further into profits.

Outside the rural sector, building was manifestly influenced by the rapid development of surplus capacity. Speculative building in Melbourne rose rapidly during the second half of the 'eighties, the "real" side to the bubble of speculation in land.

In manufacturing, the steady convergence of import prices and domestic wage rates imposed a squeeze on profits and reduced the attractiveness of industrial investment on which complaints were being voiced strongly through the second half of the 'eighties. It is not surprising in the circumstances that the rate of growth of manufacturing tapered off.

Finally, for the economy as a whole, an untenable position had been created by the end of the 'eighties with overseas interest commitments. In national product terms, interest due overseas rose from about 3 per cent of net national product in 1861 to about 9 per cent in 1890. This matched the great fall in export values over the period. By 1890, about 40 per cent of Australian exports were committed to meeting overseas interest obligations. So long as British capital was available, an increasing interest bill could be covered. But a crisis was on hand at any moment, essentially because of commitments on domestic over-expansion.

XII. *The estimates suggest that the depression was less prolonged and recovery by 1900 more complete than is usually believed.*

The Australian depression was a very heavy one—far more serious than the downturn experienced in North America or Britain. However, a definite recovery seems to have begun in 1895, to be dampened by drought. Once strong recovery got under way in 1898, the growth of output was extremely rapid, so that by 1900, net national product had regained its peak level of 1889–91. In the meantime, of course, population had risen by half a million, indicating that living standards had by no means recovered.

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APPENDIX

Australia: National Product, 1861–1900—£m.

	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870
PRIMARY:										
Pastoral	6·95	7·19	7·15	9·35	8·70	10·41	10·76	10·47	9·31	12·34
Agricultural	7·49	7·23	8·33	7·78	8·12	8·71	8·05	7·97	10·82	9·38
Mining	10·06	9·74	8·75	8·28	8·15	8·06	7·82	8·86	8·11	7·07
Forests, Fisheries and Dairying	1·50	1·50	1·50	1·50	1·50	1·50	1·50	1·50	1·50	2·00
Total	26·00	25·66	25·73	26·91	26·47	28·68	28·13	28·80	29·74	30·79
SECONDARY:										
Manufacturing	2·65	2·75	3·29	2·82	4·08	4·45	5·23	6·03	6·16	6·91
Building Construction	4·52	4·10	4·63	5·01	5·23	3·78	4·51	6·81	6·23	5·50
Total	7·17	6·05	7·92	7·83	9·31	8·23	9·74	12·84	12·39	12·41
TERTIARY:										
Private Transport	1·84	1·80	1·66	1·64	1·70	1·74	1·71	1·75	1·93	1·80
Government Railways	0·21	0·38	0·50	0·57	0·68	0·69	0·65	0·77	0·84	0·89
Government Services	3·87	3·98	3·91	3·65	3·74	4·34	4·26	4·42	4·18	4·31
Finance	2·80	2·85	3·03	2·95	3·02	3·21	3·18	3·50	3·50	3·61
Distribution	7·03	9·56	11·07	9·53	9·71	10·35	8·86	10·04	10·35	9·86
Other Services	5·63	5·52	5·59	5·60	5·78	6·48	6·76	7·21	7·70	8·42
Total	21·38	24·09	25·76	23·94	24·63	26·81	25·42	27·69	28·50	28·89
Net House Rents	7·15	6·85	6·65	6·72	7·06	8·21	7·75	7·63	7·05	8·84
Less										
Government Freights	0·13	0·24	0·35	0·44	0·49	0·51	0·53	0·57	0·67	0·63
Local Rates	0·08	0·14	0·13	0·14	0·38	0·40	0·39	0·41	0·43	0·45
Net National Product ..	61·49	62·27	65·58	64·82	66·60	71·02	70·12	75·98	76·58	79·85
Plus										
Indirect Taxes	2·20	2·03	2·22	2·20	2·48	2·71	2·86	2·78	3·00	2·83
Depreciation	1·73	1·79	2·66	2·67	2·83	2·94	3·01	3·00	3·10	3·47
Gross National Product ..	65·42	66·09	70·46	69·69	71·91	76·67	75·99	81·76	82·68	86·15

	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880
PRIMARY:										

	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880
PRIMARY:										
Pastoral	11·47	17·34	19·25	22·02	23·68	19·96	14·87	20·85	20·63	25·62
Agricultural	8·31	8·87	10·87	10·93	11·13	11·10	12·72	13·46	15·15	13·20
Mining	8·48	8·67	8·76	8·67	8·58	7·60	7·03	6·44	6·54	6·52
Forests, Fisheries & Dairying ..	2·10	2·40	2·70	3·10	3·40	3·50	3·60	4·10	4·50	5·00
Total	30·36	37·28	41·58	44·72	46·79	42·16	38·22	44·85	46·82	50·34
SECONDARY:										
Manufacturing	6·42	8·07	9·54	10·39	11·44	12·97	13·82	14·69	13·80	14·48
Building Construction ..	4·69	6·98	7·60	8·79	11·18	11·43	15·48	13·08	11·61	13·11
Total	11·11	15·05	17·14	19·18	22·62	24·40	29·30	27·77	25·41	27·59
TERTIARY:										
Private Transport	2·00	2·15	2·19	2·21	2·26	2·37	2·32	2·32	2·36	2·38
Government Railways	0·92	1·00	1·17	1·34	1·47	1·67	1·94	2·18	2·26	2·78
Government Services	4·39	3·91	4·15	5·12	5·34	5·57	6·19	6·45	6·64	6·69
Finance	3·51	4·29	4·81	5·07	5·42	5·23	5·28	5·67	5·70	6·13
Distribution	9·67	11·22	13·80	14·25	14·65	13·37	14·17	15·11	14·43	14·47
Other Services	7·78	9·48	11·02	11·69	11·36	10·71	9·80	11·95	11·59	12·06
Total	28·27	32·05	37·14	39·68	40·50	38·92	39·70	43·68	42·98	44·51
Net House Rents	9·88	11·00	11·06	10·66	10·67	11·87	12·56	11·56	15·01	16·58
Less										
Government Freights	0·74	0·77	0·93	1·06	1·19	1·31	1·48	1·64	1·70	2·08
Local Rates	0·48	0·48	0·50	0·53	0·67	0·66	0·70	0·70	0·70	0·81
Net National Product ..	78·40	94·13	105·49	112·65	118·72	115·38	117·60	125·52	127·82	136·13
Plus										
Indirect Taxes	3·08	3·44	3·93	3·89	3·77	3·89	3·96	3·88	3·85	4·02
Depreciation	3·50	3·79	4·47	4·63	4·75	5·29	5·48	6·27	6·61	6·80
Gross National Product ..	84·98	101·36	113·89	121·17	127·24	124·56	127·04	135·67	138·28	146·95
GNP (1900 Prices)	84·31	104·60	114·00	112·48	121·07	113·24	114·34	125·16	133·22	142·95

Australia: National Product, 1861–1900—£m.

	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
PRIMARY:										
Pastoral	20·81	18·62	26·18	16·79	20·16	19·14	27·32	21·77	29·06	29·10
Agricultural	13·88	16·89	18·02	16·46	15·59	15·60	18·17	16·92	21·22	17·70
Mining	7·10	7·36	7·15	7·24	7·02	6·91	7·45	8·34	9·92	8·50
Forests, Fisheries & Dairying	5·20	5·80	6·30	6·90	7·00	6·70	7·10	7·70	8·10	8·50
Total	46·99	48·67	57·65	47·39	49·77	48·35	60·04	54·73	68·30	65·19
SECONDARY:										
Manufacturing	17·96	20·00	20·87	22·40	23·25	20·00	22·84	24·28	23·95	24·82
Building Construction ..	17·21	13·65	16·22	17·13	16·64	20·62	20·61	22·35	19·71	17·85
Total	35·17	33·65	37·09	39·53	39·89	40·62	43·45	46·63	43·66	42·67
TERTIARY:										
Private Transport	2·46	2·57	2·68	2·75	2·84	2·90	2·96	3·12	3·21	3·62
Government Railways	3·21	3·57	3·83	4·29	4·65	4·60	4·73	5·46	5·69	6·36
Government Services	4·95	6·69	7·37	8·02	8·21	9·05	8·84	8·17	9·03	5·53
Finance	6·33	6·68	7·42	7·12	7·27	7·08	7·99	8·06	8·86	8·55
Distribution	16·58	18·79	19·49	18·99	18·92	17·12	17·59	18·80	20·60	19·08
Other Services	12·59	14·21	14·94	15·10	15·91	15·52	17·47	19·06	22·18	24·35
Total	46·12	52·51	55·73	56·27	57·80	56·27	59·58	62·67	69·57	67·49
Net House Rents	17·42	18·43	19·68	21·29	22·30	20·59	23·19	24·76	26·03	26·98
Less										
Government Freights	2·30	2·62	2·93	3·20	3·31	3·21	3·48	3·86	4·11	4·36
Local Rates	0·89	0·94	1·04	1·10	1·20	1·29	1·42	1·50	1·69	1·77
Net National Product ..	142·51	149·70	166·18	160·18	165·25	161·33	181·36	183·43	201·76	196·20
Plus										
Indirect Taxes	4·46	4·97	5·16	5·36	5·63	5·94	6·11	6·76	7·20	6·80
Depreciation	8·25	8·39	9·13	9·43	9·83	9·99	10·59	10·76	11·92	12·55
Gross National Product ..	155·22	163·06	180·47	174·97	180·71	177·26	198·06	200·95	220·88	215·55

	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900
PRIMARY:										
Pastoral	29·10	29·10	29·10	29·10	29·10	29·10	29·10	29·10	29·10	29·10
Agricultural	17·70	17·70	17·70	17·70	17·70	17·70	17·70	17·70	17·70	17·70
Mining	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50
Forests, Fisheries & Dairying	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50	8·50
Total	65·19	65·19	65·19	65·19	65·19	65·19	65·19	65·19	65·19	65·19
SECONDARY:										
Manufacturing	24·82	24·82	24·82	24·82	24·82	24·82	24·82	24·82	24·82	24·82
Building Construction ..	17·85	17·85	17·85	17·85	17·85	17·85	17·85	17·85	17·85	17·85
Total	42·67	42·67	42·67	42·67	42·67	42·67	42·67	42·67	42·67	42·67
TERTIARY:										
Private Transport	3·62	3·62	3·62	3·62	3·62	3·62	3·62	3·62	3·62	3·62
Government Railways	6·36	6·36	6·36	6·36	6·36	6·36	6·36	6·36	6·36	6·36
Government Services	5·53	5·53	5·53	5·53	5·53	5·53	5·53	5·53	5·53	5·53
Finance	8·55	8·55	8·55	8·55	8·55	8·55	8·55	8·55	8·55	8·55
Distribution	19·08	19·08	19·08	19·08	19·08	19·08	19·08	19·08	19·08	19·08
Other Services	24·35	24·35	24·35	24·35	24·35	24·35	24·35	24·35	24·35	24·35
Total	67·49	67·49	67·49	67·49	67·49	67·49	67·49	67·49	67·49	67·49
Net House Rents	26·98	26·98	26·98	26·98	26·98	26·98	26·98	26·98	26·98	26·98
Less										
Government Freights	4·36	4·36	4·36	4·36	4·36	4·36	4·36	4·36	4·36	4·36
Local Rates	1·77	1·77	1·77	1·77	1·77	1·77	1·77	1·77	1·77	1·77
Net National Product ..	196·20	196·20	196·20	196·20	196·20	196·20	196·20	196·20	196·20	196·20
Plus										
Indirect Taxes	6·80	6·80	6·80	6·80	6·80	6·80	6·80	6·80	6·80	6·80
Depreciation	12·55	12·55	12·55	12·55	12·55	12·55	12·55	12·55	12·55	12·55
Gross National Product ..	215·55	215·55	215·55	215·55	215·55	215·55	215·55	215·55	215·55	215·55

	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900
PRIMARY:										
Pastoral	34·10	26·02	24·40	23·78	19·54	23·50	18·34	22·43	23·33	21·52
Agricultural	13·75	13·72	12·95	10·74	8·21	14·23	14·86	15·91	13·02	15·93
Mining	10·88	10·19	10·87	11·23	10·64	10·99	13·36	15·17	19·39	19·54
Forests, Fisheries & Dairying ..	7·70	7·10	6·50	8·20	9·50	9·60	7·40	9·60	11·00	12·00
Total	66·43	57·03	54·72	53·95	47·89	58·32	53·96	63·11	66·74	68·99
SECONDARY:										
Manufacturing	25·43	21·93	17·67	17·85	18·78	20·24	20·77	21·58	23·93	24·38
Building Construction ..	20·97	9·15	4·48	5·52	3·11	6·55	1·59	6·98	7·09	6·25
Total	46·40	31·08	22·15	23·37	21·89	26·79	22·36	28·56	31·02	30·63
TERTIARY:										
Private Transport	3·64	3·43	3·15	3·00	3·07	3·30	3·54	3·47	3·62	3·87
Government Railways	6·76	7·19	6·25	6·58	6·59	6·62	7·46	7·45	7·97	8·39
Government Services	9·00	9·54	9·11	8·47	8·61	9·32	9·66	9·60	9·57	9·21
Finance	8·77	7·25	4·00	4·00	4·00	5·00	5·00	6·00	6·00	6·00
Distribution	20·09	15·77	12·85	12·21	11·93	16·02	15·92	16·53	18·74	20·44
Other Services	25·38	23·77	19·22	18·82	18·30	20·74	22·74	24·05	27·05	29·70
Total	73·64	66·95	54·58	53·08	52·50	61·00	64·32	67·10	72·95	77·61
Net House Rents	21·49	18·50	19·17	16·64	16·81	17·13	17·34	19·54	22·13	23·42
Less										
Government Freights	4·90	4·89	4·77	4·62	4·80	4·79	5·30	5·34	5·92	6·25
Local Rates	1·84	1·80	1·73	1·71	1·63	1·66	1·68	1·69	1·72	1·81
Net National Product	201·22	166·87	144·12	140·71	132·66	156·79	151·00	171·28	185·20	192·59
Plus										
Indirect Taxes	7·02	6·96	5·93	6·08	6·05	6·72	6·61	6·76	7·06	7·40
Depreciation	12·72	11·87	10·92	10·86	11·08	11·25	11·15	12·13	12·33	13·11
Gross National Product ..	220·96	185·70	160·97	157·65	149·79	174·76	168·76	190·17	204·59	213·10
GNP (1900 Prices)	208·45	172·91	157·35	177·33	167·83	194·82	190·90	217·83	219·51	213·10

THE WORLD DOLLAR PROBLEM AND STERLING

The present juncture is appropriate for a reconsideration of whether there is or is not—in some important sense—a world dollar problem. The rapid growth of German and Japanese industry during the last few years may be taken to mark the final stages of the recovery of the trade and production of the non-dollar world from the effects of the Second World War. The distortions of the post-Korea boom and its aftermath are now passed, and the effects of the 1949 devaluations have presumably more or less worked themselves out. Moreover, the pressure of excess demand that has characterized the economies of most non-dollar countries throughout most of the post-war decade has now been greatly moderated. It is true there remains a tendency for price and wage increases to outpace the growth of productivity, but the American economy seems to be suffering from this as much as the principal countries in the non-dollar world. It may therefore be argued that the elements in the dollar shortage of earlier years that arose out of the demands of post-war reconstruction, and out of a greater tolerance of inflation in the non-dollar world than in the United States, no longer seem to be influences of major importance. If a dollar problem remains now, therefore, it would seem to be associated with factors that must be considered as normal rather than deriving from the exceptional features of the post-war decade.

Moreover, up to the end of 1957 there had been no more than a suggestion that the state of approximate balance in the level of world demand might give way to actual recession: though the current recession in the United States has underlined the possibility of a serious cyclical intensification of the dollar problem in the near future. But even in the absence of a serious recession in the United States, that country's balance of payments with the rest of the world had already, for the first time for several years, developed a surplus (in the sense that gold was paid to the United States, on balance, by other countries) in the last quarter of 1956 and during two quarters of 1957.

This was partly associated with the reduction of other countries' restrictions on their dollar imports of goods and services. The check to the growth of the American economy must also have played its part in increasing the United States' trade surplus—though this showed itself during 1957, not in a decline in American imports, but in their failure to rise as fast as American exports. The removal of many restrictions on dollar payments by other countries should make it possible to see more clearly whether there is a genuine dollar problem that had been partly concealed for many years under these artificial palliatives.

The loss of gold by the non-dollar world to the United States has been part of a general decline in the international reserves—especially the gold and dollar reserves—of most countries outside North America

and Western Germany. Moreover, the extra resources of international liquidity formerly available to draw upon in times of serious difficulty from the International Monetary Fund were greatly depleted during the twelve months beginning in November 1956, the first period during which the Fund had lent really extensively. The remaining resources of the Fund would not enable it to give very great help in any future intensification of the dollar shortage—at least until its recent loans have been mostly repaid. Meanwhile, the need to repay them in two or three years imposes additional strain on several members' hard-currency reserves while the necessary gold or dollars are being accumulated.

These recent events on the international monetary scene, coinciding with the return to something that might be described as "normalcy" in the world economy for the first time since the war, have given a special topicality to the appearance of a analysis of almost every conceivable aspect of the world's dollar problem, much fuller than any that has hitherto been published.[1] (It was completed at the end of 1956, before the recent deterioration in the non-dollar world's dollar accounts, beginning in the last quarter of 1956, had become evident.) In it, Sir Donald MacDougall deploys a wide range of statistical and analytical weapons, bringing them to bear on the crucial question of whether the world's dollar problem is likely to continue, to worsen, or to improve, with special reference to the next twenty years or so. His principal discussion is couched in language that the non-specialist can approach without misgivings (economists' jargon being mostly or entirely relegated to footnotes); his summaries at the end of each chapter should prove invaluable to the more cursory reader; and in the voluminous appendices (which amount in all to about a third of the whole book) the specialist will find a wealth of theoretical and statistical material and ideas to suggest to him further avenues to explore. The book as a whole would constitute a useful basis for a whole course, at several different levels, in the theory and current problems of international trade.

But the practical importance of the book is greatly enhanced by the unmistakable warning-note that it sounds. This is the more impressive as, in an earlier analysis of the same problem, MacDougall had remained unwilling to express a definite view about whether the dollar shortage was likely to remain a permanent problem or would prove to be due to the special, temporary factors of the immediate post-war (and perhaps in some measure also the inter-war) period.[2] But in his book MacDougall comes down unmistakably on the side of those who believe that the dollar problem is more likely to remain with us than to vanish. By means of a very full and cogently reasoned analysis the author argues that only on very optimistic assumptions is the dollar problem likely to become less serious over the next twenty years: on a

1. *The World Dollar Problem.* By Donald MacDougall. (Macmillan, London, 1957.) Pp. xiv + 622. 72/- Aust.
2. "A Lecture on the Dollar Problem," *Economica*, August 1954.

wide range of less optimistic—but equally, or more, realistic—assumptions it is likely to become worse.

It is quite posible that individuals will question, or at least seek to qualify, his argument at various points. Some—probably on the basis of "hunch" rather than anything else—will accuse him of being too pessimistic (in the sense, presumably, that the range of his assumptions is biased in the pessimistic direction). Indeed, some have already done this.[3] But it is almost inconceivable that any case as well argued and supported as MacDougall's could be set up to destroy the main impression left by a reading of his book: namely, that the non-dollar world will run a very much greater risk of being dangerously wrong if it assumes that the dollar problem will not remain than if it assumes that it will prove to have been a passing phenomenon. A review of his book that concentrated upon minor criticisms and qualifications that might be made of his analysis would run the risk of obscuring without appreciably modifying its essential lessons for policy. It is far more important to analyse the policy implications of a probably continuing or recurrent dollar shortage. These are discussed by MacDougall at some length. It is clear that virtually all aspects of economic policy in the non-dollar countries must be greatly affected if we have to make the assumption that the dollar problem is more likely than not to be deep-seated.

MacDougall's Argument

The main strands of MacDougall's argument are as follows. Whilst he does not detect any long-run tendency in the United States for productivity to rise faster than in the rest of the world in periods of peace,[4] about half of the weight of his argument for the probable continuance of the world dollar problem depends upon his contention that the rest of the world is more likely than is the United States to prove unable or unwilling to keep the level of its demand from rising faster than its productivity. This greater likelihood of inflation in the rest of the world than in the United States, assuming it is fulfilled, would tend to bring about a dollar shortage: that is, to make the rest of the world try to spend more dollars than it is receiving (from normal sources of supply) at given exchange rates, with full employment, and without the imposition of dollar import controls.

It is, however, worth noting that during the year or so since his book was completed the United States has, despite the recent decline in output, had about as much difficulty as any major country (except, until late in 1957, Britain) in keeping prices from rising. Nevertheless, the United States has shown considerable readiness to take measures that are intended to check this tendency for prices to rise; so to that extent the force of MacDougall's argument that the rest of the world may on balance be less anti-inflationary minded than the

3. See the review, "Dollar Cassandra", in *The Economist*, August 3, 1957. Also broadcast talk by Mr. R. F. Harrod in *The Listener*, September 26, 1957.

4. And, as he points out, even if such a tendency were established it could work either towards intensifying or alleviating the dollar problem according to what other assumptions one makes.

United States probably remains unimpaired. After prices in the United States had been fairly stable for some years, sharp price increases once more occurred in 1957 in the United States. This should have helped to alleviate the world's dollar problem by facilitating exports to the United States and reducing imports from her. It is the more striking, therefore, that in this very period the dollar shortage has once more obtruded itself in the shape of a flow of gold to the United States (for the first time for several years).

This may seem to indicate that the structural features of the situation, to which MacDougall assigns the other half of the responsibility for what he expects to be a long-run dollar problem, may well have been asserting themselves lately; and perhaps even that their importance is relatively greater than MacDougall suggests. No serious American recession had arisen in 1957, so that the sort of cyclical intensification of the dollar problem that one may normally expect to result from a serious decline in the level of economic activity in the United States was probably not the cause, or at any rate the sole cause, of the intensification of the dollar problem in that year. The dollar problem associated with a United States recession has normally been expected to arise from a fall in American imports; but in 1957 American imports continued to rise, though less quickly than American exports, and this seems to have been the main cause of the loss of gold to the United States during 1957.[5] It is, of course, true that the difficulties that have been presented to the rest of the world by even the "sideways" movement of the American economy during 1957 may certainly be held to underline MacDougall's argument that an American recession will bring special difficulties to the rest of the world. (He points out that special factors, which cannot reasonably be expected to recur—such as a rising level of imports into Europe and a rise in United States lending —were present to prevent these serious repercussions arising from the American recession of 1953/4.) However, the cyclical dollar problem could be faced if the underlying dollar situation were sound, and it is therefore reasonable to concentrate our main attention upon the latter.

The "Structural" Factors

The "structural" factors analysed by MacDougall are those arising from secular trends in the volume of the United States' trade with the

5. In the later months of 1957 the United States' monthly trade surpluses fell slightly from the high level they had reached by the middle of the year. This came about through a fall in United States exports back to about their level in 1956 (before the Suez crisis), whilst United States imports remained fairly stable—and were not as yet showing any definite sign of an actual fall as a result of the decline in activity in the United States. In short, disinflation and tighter (general) import controls in the non-dollar countries seemed to have reduced their imports from the United States, in response to their loss of gold during the previous year or so. Thus the dollar gap that appeared in early 1957 was being closed by contraction of trade—even before non-dollar countries had been subjected to any actual reduction in dollar earnings as a result of the American recession (whose existence became clear in late 1957). Even so, the rest of the world would have lost gold on a substantial scale to the United States over 1957 as a whole but for considerable borrowing from the I.M.F. and the surplus earned by Western Germany.

rest of the world, in contrast to those elements in the dollar problem arising from any greater tendency there may be for the general price level to rise more quickly, and for over-full employment to be tolerated to a greater extent, outside the United States than within that country. MacDougall analyses these structural factors, according to the three main groups of products: foodstuffs, raw materials, and manufactured goods.

The trends in the United States' output and demand for food products in the next twenty years are about equally likely to lead to an improvement as to a deterioration in the world's trade balance with her: in some years her food imports will rise sharply; in others her food exports are likely to rise equally abruptly.

The growing United States demand for raw materials should alleviate the dollar problem considerably—provided that the rest of the world is able and willing to devote sufficient of its resources to building up its raw material-producing industries to meet this growing American demand. This means that the output of such products in the non-dollar world must be increased faster than non-dollar demand for them. If not, any consequent rise in the world prices of these raw materials is unlikely to bring about an equal offsetting rise in dollar receipts from their sales to the United States. Such increases in the price of non-dollar raw materials will stimulate the search for, and production of, synthetic and other dollar substitutes. This could result even from wide fluctuations (about the same average) in the prices of world raw materials: for when they are dear the production of substitutes will be stimulated in the United States, and when they become cheap again this new capacity will be kept in being. Commodity price-stabilization schemes may well, then, be essential in order to reduce the dollar problem, quite apart from their other merits—though they would clearly reduce the power of the non-dollar producers to compete with American substitutes if such schemes were allowed to increase the average price of these commodities over the cycle.

Greatly outweighing, on all but very optimistic assumptions, the favourable effect upon the dollar problem that may be expected to result from the rise in U.S. imports of raw materials, is the rise that is likely to occur in her net exports of manufactured goods. This is partly because of the mere fact that her visible surplus in manufactures is already large—so that even if the rest of the world can increase its exports to her as fast as it increases its imports of American goods, the absolute size of this gap will grow. But the main factor tending to raise this surplus is the predominance of the United States in the production and export of those manufactured goods for which demand grows quickly with rising real income and those for which ready substitutes are not usually available in other countries—at any rate so long as they remain new products. MacDougall points out that, even without increasing its share in any single category of world exports, the United States could greatly increase its share in the total in the coming years merely because of the concentration of its exports in those

categories, and in those export markets, that show a particularly marked growth of demand.

His conclusion about the United States' visible trade is that the deterioration in the rest of the world's net balance of trade in manufactures with the United States must be expected to exceed, on any but the most optimistic assumptions, the favourable effect on the rest of the world's trade balance with her that one may reasonably hope will spring from the rising American demand for raw materials.

United States' Overseas Investment

In the United States' investment account, MacDougall sees little prospect of relief for the world's dollar problem. However, he believes that there are good reasons for still encouraging American overseas investment; and if it were devoted mainly to building up dollar-earning and dollar-saving industries it could help to alleviate the dollar problem. But American direct overseas investment will give rise to cumulatively growing profit remittances and will probably increase other countries' spending upon dollar goods through the influence of American decisions upon the investment policies of American-financed firms in other countries: these two influences, he argues, must be expected in the long run to equal or exceed the effect on the dollar balance of any practicable outflow of American capital. But during the period before the total reflux of profits to the United States comes to offset fully the original inflow of dollar capital, the non-dollar world's dollar problem will be directly alleviated. Even if the outflow of dollars on capital account might ultimately turn out to be equalled by the reflux in the form of profits (plus higher dollar imports associated with the investment), the rest of the world may still be expected to gain, provided that the American overseas investment does lead, as it surely must, to some lasting rise in the rest of the world's real income—in particular, by increasing the productivity of industries in non-dollar countries.

This will at least make the dollar problem a less serious burden—even if the actual dollar deficit is no smaller. The consequent rise in productivity and real income could be devoted to raising gold output in non-dollar countries, or to raising their reserves in some other way. And it may indirectly make it easier to reduce dollar imports—even if the industries financed by American capital do not directly add to dollar-earning exports or dollar-saving imports.

American aid is, of course, among the most unpredictable elements in the situation, but it is unlikely (MacDougall argues) to be extended on a sufficient scale to offset the degree of deterioration that may be expected upon what MacDougall regards as the most probable within his range of assumptions about trends in trade. "Other invisible" items are not likely, on balance, to change much either way.

This is a bald—and thus inevitably in some measure unfair—résumé of his projections of what may happen to the United States'

balance of payments, on a wide range of assumptions, over the next two decades.

The importance of MacDougall's analysis of the structural factors in the trade of the United States with the rest of the world is that it underlies the probable trends in the pattern of that trade, given its pattern over recent years and in the absence of any fundamental change in the situation, on a range of reasonably probable assumptions.

There is, however, some danger that his analysis may leave some readers with the feeling that the future is determined by factors beyond our control, to an extent that would not be fully justified and which MacDougall would presumably not intend his analysis to suggest. Changes in tastes and productivity in all the countries concerned are continually modifying the pattern of trade. MacDougall's analysis merely shows how the continuance of recent trends will probably make the dollar problem harder to solve: but if we are forewarned of these difficulties we can certainly do something, perhaps a good deal, to secure the changes in the pattern of trade and production that will facilitate the balancing of the non-dollar world's accounts with the United States—especially by directing resources into dollar-saving manufacturing industries.

If, however, the problem turns out to be of the order that MacDougall's analysis implies that it may be, we shall not be able to solve it merely by such conscious influence as we may be able to exert upon the pattern of trade with the United States. It is therefore essential to decide what we should do to minimize the adverse consequences of the dollar problem if it does in fact persist.

Implications for Policy

The courses of action open to the United States as measures for relieving the dollar shortage have received ample attention and MacDougall, quite understandably, does not add any basically new ones to them. Increasingly liberal commercial policies on her part, a predictable and, preferably, increasing scale of grants (and perhaps of low interest-rate loans), a high level of employment there (and not too strong-minded an attitude about curbing inflation): all these would obviously help to alleviate the dollar shortage. An increase in the dollar price of gold, which MacDougall favours strongly, would help too, though a more rationally distributed programme of aid to the rest of the world would obviously be better than what would amount to a subsidy to the gold-producing (and the principal gold-owning) countries. However, if a rise in the dollar price of gold is becoming—as some think—now less unacceptable to American opinion than it has been in recent years, we should certainly not ignore the contribution it could make to relieving the dollar shortage. However much one may doubt the merits of this proposal compared with, say, greater and more predictable programmes of dollar aid, it would clearly be stupid to look a golden gift horse in the mouth if there is any chance of its being offered.

But whilst we must certainly do what we can to increase American awareness of the probable persistence of the dollar problem, and of the sort of American policies that would do most to alleviate it, the principal attention of the non-dollar countries must be devoted to the question of what economic policies they must themselves adopt if they have to assume the likelihood of the indefinite continuance of a dollar shortage, or at least of its periodic emergence as some form of "crisis".

The prevention of inflation is not, of itself, as MacDougall emphasizes, an adequate answer to the dollar problem. The more successfully inflation can be held in check in the non-dollar world, the less severe will the dollar problem be. But the last two years have demonstrated that even some appreciable slowing-down of the growth of national output is not certain to prevent wage-price inflation so long as something close to full employment prevails. The extent of the curtailment of growth that would be necessary to prevent inflation completely in the non-dollar world, or even to prevent prices from rising faster than in the United States, might turn out to be socially intolerable, politically and strategically dangerous (especially in view of the striking rate of economic growth in Soviet Russia), and in conflict with other economic objectives at least as important as the relieving of the dollar shortage. On the other hand, the alternative, defensive measures open to the non-dollar world are likely also to do something to check the growth of real income. They involve principally decisions to buy goods from sources that are at current exchange rates relatively dearer than their dollar substitutes. The partial alternative of accepting some small curtailment of growth, through keeping demand in check, will not necessarily be the worse evil. Something of each—disinflation (or deflation) and dollar import controls—may well be required.

The choice of policies to deal with the dollar problem of the non-dollar world must take into account the probable reactions of American policy to whatever measures are taken by the rest of the world. MacDougall stresses that measures to restrict imports from the United States may defeat their own ends so far as they call forth psychological reactions on the part of Americans of a sort that will make them less willing to reduce tariffs and other restrictions on imports. The more American opinion can be reconciled to, or even brought to support, the measures taken by other countries to solve the dollar problem, the less will be the likelihood of retaliatory American action. One might add that even if it proves impossible to reconcile American opinion to the need for measures by other countries to restrict dollar imports, the explanation to the American Government of the reasons for such measures, especially if they could be concerted by a large number of countries, might usefully be coupled with an indication of what measures of American policy would render them unnecessary. It should constantly be emphasized, in any representation to the United States on the subject, that all countries stand to benefit if the dollar problem can be relieved by the expansionary measures which lie in the hands of the United States, since they would involve in some way raising the

world's supply of dollars and therefore its ability to buy more dollar goods. The measures that the rest of the world may be forced, unwillingly, to implement in order to relieve the situation are ones that will tend to reduce trade between the United States and other countries (by reducing dollar imports in order to add more dollars to the international reserves of the countries in question). These measures will reduce real income, at least in the non-dollar countries. To bargain, or even to explain effectively, in this way, the non-dollar world (or, at least, the principal non-dollar countries) will need to speak virtually with one voice, and must show itself able and willing to implement a concerted defensive policy aimed at relieving the dollar problem and raising its dollar reserves, at the lowest real cost to itself—if the alternative expansionary ways of affording relief are not forthcoming on an adequate scale from the United States.

Exchange-Rate Policy

The choice of defensive measures open to the non-dollar world includes exchange-rate measures. If MacDougall's expectations are fulfilled, occasional devaluations of most non-dollar currencies in terms of the dollar will be needed to close the dollar gap. MacDougall argues forcefully the case for fixed rather than fluctuating exchange rates; that is, for using the present "adjustable peg" method for devaluing (where necessary), with generally fixed parities (or rates varying, as now, within a small margin). Two further arguments on the other side might well be added to those that he acknowledges. These seem to emerge out of MacDougall's own discussion of other aspects of policy. It is not suggested that these would decide the case against MacDougall's preference for fixed exchange rates, but a fully balanced consideration of this matter should certainly take them into account.

The first lies in the undoubted need, which MacDougall naturally acknowledges, to economize in the use of the gold and dollar reserves of the non-dollar countries. To a considerable extent, variations of exchange rates and drawing on reserves are alternative policies. Some of the strain on Britain's reserves during 1957 would have been reduced if the Bank of England had not accepted the *de facto* commitment to convert transferable sterling into dollars on the unofficial market at a rate not far below the official one; an appreciable lapse from this rate would have been possible without its falling to the point at which gold losses from "commodity shunting" would have become serious. To let the rate fall—especially in response to purely speculative movements when the current account position was basically sound (as in 1957)—might well induce counter-speculation to come about more quickly and thus afford relief to the reserves. At any rate, it does not seem to be established that to allow greater fluctuations in these unofficial rates would actually increase (and it might reduce) speculation of the undesirable, disequilibrating sort. And even though other considerations arising out of the special position of sterling may be held to decide the issue in favour of stability of the exchange rate of

sterling, that decision should be taken only after giving due weight to the following implications of the present low level of the sterling area's reserves.

It is true that when there are speculative movements that greatly reduce the reserves of a country whose currency has a fixed exchange rate, the speculative flow of capital will be subsequently reversed—and the reserves replenished—either when it becomes established that the currency will not be devalued (or that some other currency the speculators had been favouring will not be appreciated), or when it does in fact devalue. When however reserves have fallen as low as those of most non-dollar countries are at present, it may no longer be feasible for them to choose to accept a widely fluctuating reserve coupled with fixed ("adjustable peg") exchange rates; for this may mean that at times their reserves fall to zero—or, at any rate, to an unworkably low level.

The other argument for exchange-rate flexibility that may be derived from MacDougall's discussion of a different topic is that greater flexibility of the exchange rates of non-dollar currencies against the dollar might help to reduce the chance of retaliatory action being taken in the United States to protect American producers whose domestic (and perhaps also external) markets are threatened by a sharp adjustment of the exchange rates of non-dollar currencies against the dollar. MacDougall discusses in some detail the possibility of retaliatory action in the United States in response to measures taken with the object of increasing the dollar exports of the rest of the world. But a more gradual adjustment of exchange rates would be less likely to call forth such counter-vailing measures on the part of the United States than would a large, sudden adjustment of the parities of non-dollar currencies—especially as the latter would probably involve many of them devaluing together, as in 1949. A more gradual adjustment of exchange rates would surely make it much harder for the injured American producers to dramatize their plight, to focus public attention upon their difficulties and to concert their opposition in such a way as to arouse national sympathy. And the real losses to them and to producers in other countries would surely be far less if the adjustments of production and trade—both in the non-dollar and the dollar world—were made gradually over time, rather than being concentrated into the immediate aftermath of a widespread devaluation. Moreover, if the "adjustable peg" method is used as one of the principal ways of reducing the world's dollar shortage, each change must, as MacDougall argues, be large enough to "overshoot the mark" somewhat and so to restore the surplus of the non-dollar world (and confidence in the new parities). If that occurs it might be much easier for the protagonists of greater protection in the United States to represent the improvement in the dollar balance of other countries as unnecessarily large, and therefore as justifying tariff increases to protect the American interests thus affected (or the maintenance of existing barriers to imports that would otherwise have been removed).

In any case, devaluation by the adjustable peg method may, by overshooting the mark, bring about a degree of deterioration in the terms of trade of the non-dollar world (though not necessarily of all non-dollar countries) that is not strictly necessary at the time. Indeed, it might even turn out not to be necessary in the future. Its immediate result would therefore be a reduction in real income in the non-dollar world that might have been better postponed until it was strictly necessary, and perhaps better postponed also because there was reason to hope that rising productivity and real income in the non-dollar world might subsequently make that degree of devaluation unnecessary, or at least render non-dollar countries better able to stand it if it had to take place.

The Problem of International Liquidity

MacDougall's analysis indicates that we must view as probable in the long run periodic devaluations, or gradual depreciation, of most of the non-dollar currencies in terms of the dollar by whatever method they are effected. This obviously has serious implications for any non-dollar currency; and for sterling, in particular, if it wishes to continue to be used as an international currency. Even if devaluations of most or all non-dollar currencies do not prove necessary in the event, the mere expectation or fear that they may occasionally occur must jeopardize, at least from time to time, the status of sterling as an international store of value and to some extent also even as a medium of exchange. The past two years have shown how easily serious "runs" on sterling can develop, even when the sterling area's current account is basically fairly strong, whether for political reasons, or because some other currency is thought likely to appreciate (as with the speculation in 1957, and to a lesser extent in some earlier periods, which led to widespread sales of sterling and purchases of German marks). If to these potential threats to the sterling area's reserves is added the distinct possibility that sterling may periodically have to be devalued in terms of the dollar, it is likely that the present level of the reserves will prove quite inadequate to withstand the speculation that is likely to occur from time to time. If devaluation of sterling and of many other non-dollar currencies is to be regarded as even a reasonable likelihood, special measures will then clearly be needed to meet the situation.

One course that many will suggest is that the United Kingdom should now be prepared to tighten controls over the use of sterling and perhaps actively discourage residents of non-sterling countries (at any rate) from holding and using sterling as an international currency, in view of the sudden and dangerous pressures upon the already low reserves that occur when there is widespread—if temporary—conversion of holdings of sterling into other currencies for speculative reasons. One objection to such a change of policy would be the serious strain on the reserves that would be imposed while existing holders of sterling were converting their holdings to, say, dollars and marks. Another objection is that earnings arising from sterling's position as an inter-

national currency should not be readily forgone; though from a short-term point of view, at least, with the reserves as low as they are and the possible motives for speculation potentially so strong, there seems to be general agreement that these earnings (or, rather the part of them that would have to be sacrificed) would not outweigh the great risks involved for sterling in being such a widely held international currency if no other way can be found to protect sterling from serious bouts of speculation. The position is serious when a rush to transfer sterling into other currencies could at almost any time, as the experience of 1957 seems to imply, bring a fall in the reserves on a scale that might precipitate a devaluation of sterling. Nevertheless, it is vital that sterling should remain an international currency, in default of readiness on the part of any other stronger currency to develop the institutions and to accept the responsibilities that would enable it to replace sterling as the principal international medium of exchange; including, in particular, the responsibility of ensuring that the world had enough of that currency to enable it to be used to finance a growing volume of international trade. The system of credits based on sterling and a few other European currencies with monetary areas of their own effects an immense economy in the use of the slender gold and dollar reserves of the non-dollar world. It is essential to retain and extend this means of economizing in the use of the very low hard-currency reserves of the non-dollar world (outside Western Germany). A failure to do so would constitute a serious threat to world trade and real income, for in the absence of the financing facilities provided by sterling, in particular, each country's attempts to safeguard its inadequate hard-currency reserves, in which settlement of its deficits with most areas would then have to be made, could well cause a downward spiral of trade, from which all countries would suffer—Britain and the other sterling countries as much as any. From a broader, longer-term and less superficial viewpoint, therefore, it is essential that sterling should continue to play (or that some equally plentiful currency should assume) the role of being the main medium of international transactions of the non-dollar world. A return to the imposition of strict controls over the transferability and convertibility of sterling would be an international calamity even if it should turn out that it would reduce appreciably the occasional speculative strains on Britain's gold reserves.

But the system is at present quite inadequate to stand any appreciable strain, and urgent action is necessary if it is to be fitted to play its role properly in future. Such action is in any case necessary in the present state of low international liquidity. It is doubly so if the general outlook for the long-term dollar problem is as MacDougall paints it.

The first type of action that is needed is that the resources of the International Monetary Fund should be greatly increased. Up to near the end of 1956—about the time when MacDougall's book was finished—relatively little use had been made of the resources of the I.M.F. But in the past year the large loans to support sterling, including large

amounts in the form of "stand-by" arrangements, and also loans to France, Egypt, India and the Netherlands, have greatly reduced the Fund's resources. This means that support such as that given to sterling in late 1956, which showed the efficacy of I.M.F. loans on a large enough scale to check a speculative flow of funds threatening the sterling area's reserves, could not be repeated, at least until these loans are repaid. In the meantime the need to repay them will of course constitute an additional strain on sterling, since the reserves have to be built up to a point at which they will stand this repayment in the course of two or three years. In any case, the Fund's quotas, which were agreed upon in 1944, are in urgent need of revision in the light of changes in price-levels and the change in the volume of world trade since the quotas were arranged. This revision (which may take place periodically under a provision of the Fund's Charter) should also take into account the main changes in the relative economic strength of the Fund's members since the I.M.F. was founded; in particular, the great increase in Western Germany's production and trade would have to be taken into account in any such revision.

The principal obstacles to increasing I.M.F. quotas[6] are two. The minor one is that any all-round increase in quotas might require further subscriptions of gold to the Fund by its members—many of whom now have dangerously low gold reserves. It might be resolved by allowing members to include in their published gold reserve figures the gold tranche of their subscription to the I.M.F. (or, at least, the new addition to it).

The major difficulty in the way of increasing the I.M.F. quotas is the long-standing objection of the United States to becoming committed to what many Americans feel could amount to a large-scale "give-away" of dollars, over which they would have little control. Certainly, the increased availability of dollars through the Fund would be no way of overcoming the dollar problem as such, since the essence of the Fund's working is that its resources are for meeting *temporary* disequilibria. Those countries asking that quotas should be increased should constantly emphasize that no departure from this principle is intended. And if this principle is maintained, it should become clear that no "give-away" of dollars would be involved—only the provision of extra liquid resources of all currencies, including the dollar, to tide members over temporary difficulties.

As an alternative to any form of increase in quotas, or to supplement such an increase, the I.M.F. might examine the possibility of increasing its resources by borowing (at competitive interest rates) from those members able to lend gold or whose currencies were in strong demand.

The temporary difficulties that member currencies have to face are really of two sorts. There are, first, current account difficulties and temporary reductions in the ordinary long-term capital inflow upon which members have come to rely—and which they may reasonably

6. These determine both members' subscriptions and their drawing rights.

expect. If a member country's exports fall, or if the inflow of long-term capital is sharply reduced, it will often wish to borrow from the Fund while it makes the necessary adjustments—or until its balance of payments recovers.

Secondly, there is the sort of difficulty in which sterling has been involved several times over the last year or two, through the purely speculative short-term movements (often not arising, or not wholly, from actual or prospective current account difficulties[7]) to which an internationally-held currency is especially subject. These speculative movements are, in their nature, likely to be reversed—either after devaluation has occurred or when world confidence in the currency in question is restored (as it was after the I.M.F.'s stabilization loan to Britain in late 1956, and after the I.M.F.'s statement about the soundness of sterling's current account, coupled with the rise in bank-rate and other measures in Britain, and the denial of the intention to appreciate the mark, in September 1957). The part that the Fund can play is to check such speculative movements, especially when they are based upon irrational factors (such as a rumour that sterling will be devalued when in fact its current account is strong), but also when they are primarily due to the low level of the reserves of the country whose currency is threatened—perhaps at a time of current account deficit. In such circumstances it is important that the I.M.F. should be able to step in and give adequate support to the threatened currency in order to arrest the speculation—just as a central bank normally steps in to arrest a crisis of confidence in the banking system by acting as lender of last resort. But the essence of such intervention is that it must be on a large enough scale to restore confidence; ideally, the Fund should be able to intervene upon whatever scale is necessary for this purpose—which implies access to unlimited resources of whatever currencies speculators are trying to hold. What is now needed is the embodiment of this "lender of last resort" principle in the Fund's Charter by making available to it the resources to act in a similar way on any future occasion when a member currency (especially one that is widely held) is threatened by speculation. If it proves impossible to secure American acceptance of an upward revision of the quotas large enough to ensure that the Fund will have the resources for this purpose, it would be worth considering whether all members might agree to make available—perhaps at reasonably high rates of interest—additional resources to the Fund which might, perhaps, be called upon only for meeting this need for massive resources to deal with an essentially reversible flow of speculation against a member's currency. It is true that support from the Fund would not be likely to stop the speculation whenever a currency was likely to be devalued because of serious and fundamental balance of payments difficulties on its current and long-term capital accounts; but the Fund might prevent such speculation from causing a devaluation, because of the inadequacy of

7. Though this is not to deny that such speculation may often arise as a result of current account difficulties.

the reserves backing the threatened currency, when that was otherwise undesirable. If the I.M.F.'s resources cannot be increased to enable it to offset such speculation, other measures will be the more necessary.

A Gold Guarantee for Sterling?

The other course of action that seems to be necessary if sterling and other non-dollar currencies are in fact faced with the likelihood of occasional devaluation in terms of the dollar is one that lies in the hands of the United Kingdom, though for psychological reasons there is much to be said for the initiative in suggesting it being taken by other sterling countries. MacDougall refers briefly in a footnote (with acknowledgements to Mr. Harrod, who has since mentioned it in a broadcast[8]) to the possibility that Britain shoul dgive to holders of sterling a gold guarantee of the value of their sterling balances (as was done to a few holders and on a partial scale in 1949). This course would seem to be especially necessary in the light of the inadequacy of the world's gold and dollar reserves. For there will otherwise be every incentive to holders of sterling to sell it for gold or dollars (officially if sterling is made convertible and in unofficial markets at not far below the official rate if the present situation of *de facto* unofficial convertibility of transferable sterling continues) if at any time it seems likely that sterling will shortly be devalued. Even members of the sterling area will naturally feel tempted in such circumstances to avoid paying into the reserves gold that they produce (perhaps even dollars that they earn), and to hasten withdrawals from the reserves for exchange into those currencies that are expected to retain their previous parity if sterling is devalued. Those that normally (or invariably) earn dollar surpluses—notably the newly independent members, Ghana and Malaya (and shortly Nigeria)—may naturally be unwilling to pay their net dollar earnings into the reserves if the value of the sterling balances they receive in exchange is likely to be reduced by a devaluation of sterling. Ceylon, at that time the only independent member of the area who was a regular net dollar earner, was understandably piqued by the fall in the dollar value of her sterling balances in terms of dollars as a result of the devaluation of sterling in 1949. As the area's main net dollar earners (formerly dependent territories) will in the future be completely sovereign in all matters of economic policy, it is important to make it in their interests to continue to hold their reserves in the form of sterling—quite apart from considerations of equity. But all holders of sterling, including the dollar-deficit members of the sterling area, lose to the extent of any devaluation of sterling by holding sterling rather than gold or dollars. It is quite unfair and undesirable, if sterling is liable to be devalued, to expect them to hold it (rather than try to accumulate their own dollar reserves) merely because they are members of the sterling area, when non-members are free to turn their sterling into other currencies whenever

8. See *The Listener*, September 26, 1957. Mr. Day has also mentioned it with approval ("What Price the Sterling Area?" *The Listener*, November 21, 1957).

a devaluation of sterling seems likely. The working of the sterling area must be based on the self-interest of its members. It will in any case be a poor advertisement for the advantages of membership if members of the area suffer as a result of holding their reserves in sterling, whereas Britain, holding her own reserves in gold and dollars, would suffer no such fall in their dollar value if sterling were devalued.

It is true that in the immediate aftermath of devaluation, before prices in sterling had started to rise in response to the devaluation, Australia, say, might not suffer an actual reduction in the real value of her sterling balances in terms of what they could buy in sterling (or other devaluing currencies). The full loss in the real value of sterling balances due to the devaluation would not, for this reason, amount to the full extent to which sterling was devalued. The immediate loss of purchasing-power of sterling balances would be in terms of what they could buy if exchanged into dollars (or other currencies that were not devalued). But the important consideration is that *by comparison with a country that had elected to hold dollars* rather than sterling, a country holding its reserves in the form of sterling balances would suffer a loss equal to the full extent of the devaluation. And since the aim should be to make it worth while (quite apart from any considerations of equity) for countries to continue to hold their reserves in sterling rather than gold or dollars, they should be compensated for the full loss of dollar value to their sterling balances if sterling were devalued.

The only objection from Britain's point of view to offering such a guarantee would be that its fulfilment would impose a burden upon her in the aftermath of any devaluation that might prove necessary. But we cannot consider it right that Britain should be able to obtain a large windfall gain by devaluing her currency, in the shape of the consequent reduction in the real burden of her obligations to other countries which hold their reserves in sterling. Even if the United Kingdom is satisfied that the reaping of such a gain at her creditors' expense can be considered a satisfactory way of honouring her external obligations and of seeing justice done to her creditors, it is still possible to argue that, on the narrowest grounds of self-interest, Britain would do well to offer such a guarantee of the gold or dollar value of the sterling balances. For by giving such a guarantee Britain might in some circumstances be able to avoid devaluing sterling—or at least to reduce the extent or postpone the date of any devaluation made necessary by fundamental factors. For it would then not be necessary to devalue sterling merely because the reserves were threatened by a speculative outflow of short-term capital arising from other countries' fear that sterling would be devalued. They would become readier to hold sterling and to continue to use it to finance transactions through London: and confidence in sterling would grow progressively once one of the main influences that might precipitate a devaluation had been eliminated. There would, moreover, no longer be any necessity to maintain deflationary policies, especially high interest rates, merely to discourage

speculative pressures on sterling. Output in Britain—and consequently throughout the sterling area—could thus be maintained at a higher level. The danger that invisible earnings would be lost to Britain, and her invisible payments greatly increased, because of the high level to which her interest rates might otherwise have to be raised in order to protect the reserves (as in September 1957) would also be eliminated. And so far as the alternative would be tighter exchange controls over the sterling balances of non-residents—which would reduce their willingness to hold and use sterling—the gold guarantee would probably keep Britain's invisible earnings considerably higher than they would be likely to be under a regime of tighter exchange control.

There might be the purely psychological difficulty that the offer of such a guarantee could conceivably be interpreted abroad as a sign of weakness. But it need not imply any confession by the United Kingdom Government that a devaluation of sterling would perhaps be necessary in future. If Britain felt that the offer of a guarantee might be interpreted thus, the best way of approaching the matter might be for Australia and India, say—as two countries that have probably as much as any to gain by such a guarantee—to approach the British Government, at first informally, and ask for it. The United Kingdom Treasury could then, in effect, publicly say, "Our policy continues to be to maintain the present exchange rate of sterling; but since expectations on the part of some holders of sterling that it might be devalued have from time to time caused serious reductions in the reserves, we are willing to emphasize our determination to hold the present parity by giving a guarantee of the gold (or dollar) value of all sterling balances". If sterling was not, in fact, subsequently devalued Britain would lose nothing, and would gain immeasurably from the increased willingness of the world to hold and use sterling and from the new willingness of holders of sterling to refrain from withdrawing it when there was any fear of devaluation. If subsequently sterling were devalued so that the guarantee had to be implemented, at least the speculation that would otherwise have preceded and probably also hastened the devaluation would have been avoided, and Britain's current invisible earnings would have been maintained. Moreover, the consequent continuance, and even extension, of the use of sterling as an international currency would do much to economize in the use of the world's resources of gold and dollars; and the consequent maintenance of world trade and payments would benefit no one more than Britain. Under the gold standard sterling was widely held and used because of the (subconscious) assumption that it would not be devalued. That degree of confidence in the present parity of sterling can never return after its devaluations of this last half-century. The only alternative is to achieve the same effect by artificial means; namely, by seeing that overseas holders of sterling have the same incentive to continue holding it as they would have if they believed sterling would not be devalued. The offer of a gold guarantee would surely achieve this.

It is true that such a guarantee would not meet the threat of speculation based on the fear that the mark, say, might be appreciated in terms of sterling. But Britain might even consider offering a guarantee of the value of sterling balances in terms of marks (at any rate in periods when that seemed desirable) if that would eliminate a degree of pressure on the reserves that would otherwise have led to a devaluation of sterling. Otherwise, there would still be need for I.M.F. action, on the lines suggested above, to support internationally held currencies such as sterling in the face of such pressures. In the absence of adequate resources being available to the I.M.F. to protect an internationally held currency from such threats, the offer of such a guarantee would be the more essential.

Sterling might also be threatened by waves of speculation based on an expectation that the sterling area's exchange controls might be tightened in a way that would reduce the transferability of sterling held by residents of other countries. But the main argument for imposing such tighter controls is the possibility of withdrawals based on the fear of devaluation; if fears of devaluation no longer led to mass withdrawals of sterling balances, the main argument for limiting the transferability and convertibility of sterling held by non-residents would disappear. (The sterling countries' own powers to limit their non-sterling spending by various forms of exchange control would, of course, remain unaffected and might still have to be exercized in order to prevent their residents from speculating upon an expected devaluation of their own currency.)

The other main way in which the non-dollar world could continue, and carry further, measures to economize in the use of its inadequate reserves of gold, dollars and marks, would be to maintain (and if possible widen) something like the present facilities of the European Payments Union. The Union has in effect constituted an important clearing house for the transactions of a large part of the non-dollar world including (indirectly) many countries outside both Western Europe and its affiliated monetary areas.

Discriminatory Import Controls

Whatever use is made of exchange-rate adjustments to close the dollar gap, MacDougall expects that discriminatory dollar import controls will also have to play some part. (But would not the need for them be less if exchange rates were flexible? And might not the need for flexibility be greatly increased if concerted discrimination should prove impracticable?) He emphasizes the need to keep this weapon in reserve, whilst acknowledging the great difficulties involved in securing the adherence of a number of countries to a concerted policy of discrimination against dollar goods (if that should prove necessary as a means of maintaining trade and payments within the non-dollar world in the face of a serious decline in its dollar receipts).

But one wonders whether he is not a little sanguine in hoping that this weapon can and will be used extensively. Even within the sterling

area its use seems to have been almost abandoned. Its revival will obviously be very difficult in view of the independence of the former chief net dollar earners, and of the low level of international reserves (and urgent requirements for development) of such dollar-deficit countries as India and Pakistan, which are not likely to accept on top of their already stringent controls any obligation to refrain from buying dollar goods wherever they believe these to be the best value. The basic group for applying a concerted policy of discrimination against dollar goods would presumably have to be the sterling area; but in effect this seems certain to mean that it would be imposed by Britain, Australia and New Zealand. Presumably some of the poorer members of the dollar pool (including those of them who are dollar-surplus countries) might be bribed to come into the arrangements by being offered substantial (sterling) assistance with their development programmes on the condition that they bought fewer goods from dollar sources. But are Britain, Australia and New Zealand willing to accept the substantial increase in their aid to such countries that this would imply (even though such an increase may well be desirable in any event on grounds of humanitarianism and long-run political self-interest), as well as assuming the main responsibility for imposing the bulk of the dollar import controls that would be necessary?

But assuming that somehow the sterling countries are able and willing to accept, in some future dollar crisis, the obligation to discriminate substantially against dollar goods, will they be able to secure the co-operation of the other principal non-dollar countries? It is important to remember that since the sterling area last imposed severe dollar import controls, most countries of the world have virtually removed the element of discrimination against dollar goods in their import policies; and they will be reluctant to re-impose it. Yet if most or all of the non-sterling countries do not, the sterling countries would run a considerable risk of finding dollar goods re-exported to them (perhaps in processed or manufactured form) from other non-dollar countries that had no such dollar import restrictions, and of being undercut in common markets by exporters from other non-dollar countries who could obtain cheaper materials and equipment freely from dollar sources.

The adherence of other non-dollar countries to a common system of dollar import controls might be secured by the sterling countries discriminating against their goods also if these other non-dollar countries did not co-operate in applying discrimination. But it is highly unlikely that the sterling countries would readily accept this further dose of self-sacrifice merely in the hope that it would result in other non-dollar countries taking measures that would be desirable to restore the health of the non-dollar world's accounts with the United States.

If an objective appraisal makes it seem likely that some element of discrimination against dollar imports may from time to time be in the interests of the non-dollar world (and MacDougall's analysis certainly does suggest this) it is of great importance to find some way of

securing the adherence to such a scheme of most or all of the countries of the non-dollar world, and to work out a way of administering it that will cause the minimum real cost to those applying it—and, indeed, to the world as a whole. The crux of the matter is that even if all non-dollar countries acknowledged the need for such a scheme, it would still be in the interests of each of them individually that others should do the necessary discriminating against dollar goods. And without the will to co-operate, the right to discriminate accorded by the "scarce currency" clause of the I.M.F. Charter could be of little real effect.[9] Some sort of system of incentives may therefore be necessary to secure the co-operation of many countries in implementing any discrimination that is thought necessary. However great a departure this might seem to be from established practice it would clearly be preferable to relying vainly upon the hope that, if it became necessary to implement such a policy, non-dollar countries would co-operate in drawing up such a scheme of discrimination, and would undertake the self-sacrifice needed to implement it. Ideally, of course, mutual agreement would be preferable. But the danger is that informal methods will be relied upon and then be found inadequate to secure the required policies. Whether the discriminating group is the sterling area or—especially—if it is a wider group, attention should be given to this need to draw up more formal means of securing the agreed objective, in case the less formal methods fail.[10]

Even if such a scheme of discrimination never has to be put into practice (as one may hope), its drawing-up could make the crucial contribution to alleviating the dollar problem. Perhaps the major countries of the non-dollar world could indicate the degree of discrimination against dollar goods that they believed to be the indispensable minimum needed in an existing situation (or in certain hypothetical circumstances, such as a decline by a certain percentage in United States imports) to restore their reserves of gold and dollars to a safe level; and they might agree upon implementing such a programme unless other expansionary measures were taken—by the United States, in particular—to secure the same end by other means. They might thereby encourage the United States to take such expansionary measures, and might assist the task of an American administration that wished to help, by in this way linking their requests directly to the interests of American exporters, so emphasizing to American opinion the fact that the ability of other countries to buy more dollar goods depends upon the level of American imports. The scheme agreed upon among the non-dollar countries might provide for the introduction of a given degree of discrimination against dollar goods (say, a preference for non-dollar products wherever their prices were not more than a certain

9. In any event, the clause seems to envisage the discrimination being imposed only (or mainly) by those countries in bilateral deficit with the scarce currency country—which would not be the most economic way of closing a dollar gap.

10. I have suggested some possible forms of incentive schemes in *Sterling and Regional Payments Systems,* Melbourne and Cambridge, 1956.

percentage above those of dollar goods) when the hard-currency reserves (net of liabilities) of the members of the group fell below a certain figure.

The particular actions that the United States should take at any given time would be less important than the effect these actions would have upon the supply of dollars to the rest of the world and upon the reserves of the countries which had undertaken to impose the discrimination if this relief were not provided. It need not take the form of increased dollar aid: measures to raise the general level of activity or of spending in the United States could be as effective, as would a more liberal commercial policy in respect of American tariffs and import controls. The degree of discrimination that would need to be imposed in any given period would of course vary with the relief that the United States administration succeeded in affording, and it might be geared on a sliding-scale according to the state of the reserves of the discriminating group (or, if the group were large enough, to the balance of payments of the United States with the rest of the world).

This considerable discussion of discrimination must not be interpreted as a preference for it rather than other measures. Certainly the more one desires to avoid discrimination, the more important is it to secure the implementation of other policies that will render discrimination unnecessary. First and foremost, this implies a preference for solving the dollar problem (whatever form it takes and however great or small, persistent or periodic, it may be) primarily by expansionary means—which will be possible only so far as the United States adopts economic policies that will increase the world's supply of dollars. To the extent that these expansionary solutions are not forthcoming, the non-dollar countries will have some choice about how much they will rely on exchange-rate policies, how much on deflation, and how much on discriminatory import controls. But the difficulty of securing an agreement to impose dollar import restrictions makes it highly unlikely that this weapon will in fact be relied upon to an undue extent—though it makes it likely that unless some general agreement is reached on the matter, those few countries that are willing to restrict dollar imports will have to restrict them with great severity. It would reduce the degree to which trade was distorted if the burden of dollar import restrictions were widely, and therefore thinly, spread. The more one fears the adverse repercussions of such restrictions therefore, the more whole-heartedly one should favour the drawing-up and the implementation of such an agreement—which would be likely to minimize the adverse effects. Such a course should also be favoured because a concerted willingness to implement a programme of discrimination, if more expansionary measures to the same end were not forthcoming, would be the best, perhaps the only, bargaining-weapon that the non-dollar countries would be able to produce to encourage the United States to take measures to improve the situation, and so render the discrimination unnecessary.

Conclusions

The principal implication of MacDougall's book is not that the non-dollar world should, here and now, impose a defensive and restrictive system. It is, as he says, rather that non-dollar countries should leave a way open to retreat towards such defensive measures as discrimination and limitations upon convertibility if this proves necessary. One is tempted to argue that the technological developments at present in train make it quite impossible to foresee the future pattern of world trade and payments with even moderate confidence. But there is no strong reason at present to suppose that these technological changes will do much to alleviate the dollar shortage—and they might well make it worse. At any rate, MacDougall has made it clear that there is sufficient danger of the world dollar shortage proving to be a long-run problem to make it quite indefensible to fail to draw up policies to take that possibility into account. At the very least, we would run considerable risks by not doing so, and none by having the defensive policies ready to hand—even should they subsequently prove unnecessary. The task of drawing up the plans is a necessary and immediate one; it is nevertheless possible to hope that their very formulation might spur the United States to take helpful action and that this response by the United States would render their implementation unnecessary. The task of framing these defensive plans can and should go hand in hand with a whole-hearted reconsideration and, where necessary, the revision of international monetary institutions and the sterling system, as well as of domestic and international economic policies, in directions that will make it the less likely that the restrictive and defensive policies will have to be applied.

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DEMAND ANALYSIS AND THE SAVINGS FUNCTION

Recent advances in the theory of international trade (principal refs. 1, 2) rest heavily upon a fundamental theorem of demand analysis first developed by E. Slutsky (3), and later jointly by Professors J. R. Hicks and R. G. D. Allen (4). These writers have shown that, in certain circumstances, the Marshallian partial elasticity of demand, for which we use the notation

$$\frac{\partial x_i}{\partial p_i}\frac{p_i}{x_i}$$ (x_i is the quantity consumed of the i^{th} good, p_i is its price)

and the quasi cross elasticities

$$\frac{\partial x_i}{\partial p_j}\frac{p_i}{x_j}$$ ($\frac{\partial x_i}{\partial p_j}$ is the rate of change of consumption of the i^{th} good with respect to a price change in the j^{th} good)

can be divided into two parts, income effect and substitution effect.

In particular considerable use has been made of the fact that the income effect part is equal in magnitude to the propensity to consume the good in question. In fact we can write

$$\frac{\partial x_i}{\partial p_j} = -x_j\frac{\partial x_i}{\partial y} + \sigma_{ij}$$

where $\frac{\partial x_i}{\partial y}$ is the rate of change of consumption of the i^{th} good with respect to a change in money income y and σ_{ij} is a symbol representing substitution effect.

From this it follows at once that

$$\frac{\partial x_i}{\partial p_j}\frac{p_i}{x_j} = -p_i\frac{\partial x_i}{\partial y} + \frac{p_i}{x_j}\sigma_{ij}$$

$p_i\frac{\partial x_i}{\partial y}$ is, of course, the proportion of any increase in money income which would be spent on the i^{th} good.

A further important theorem states that substitution effects are symmetric so that

$$\sigma_{ij} = \sigma_{ji}$$

In words, the rate of change of x_i due to income compensated changes in the price of good j equals the rate of change of x_j due to income compensated changes in the price of good i. This symmetry theorem also has applications in the theory of international trade.

Unfortunately these two results are strictly true only for individual consumers and only for individuals who do not save. They do not apply, without considerable modification, to the community as a whole and in some respects they may be held not to apply at all to communities which save. Some doubt exists therefore as to how far we can be justified in applying them in the macro-economic field and in contexts where saving, and price induced changes in saving, are key features of the discussion.

The modest purpose of the present paper is to attempt to strengthen the foundations of the international trade arguments referred to, by reworking the Slutsky theorem giving explicit consideration to saving. Earlier treatments of this subject (5 and 6) have not been entirely satisfactory, partly because more than one approach seems possible and it is not at all obvious which of these is likely to be the most satisfactory in any particular context; and partly because at the time of writing the more practical uses to which the Slutsky theorem has subsequently been put were not envisaged. The whole discussion is confined to the individual consumer, the aggregation problem being left for a later article.

It will be shown that there are at least three ways of splitting elasticity into quasi income and substitution effects. By method one the symmetry of substitution effects is lost so that σ_{ij} is not equal to σ_{ji}. On the other hand the income effect remains as before. This is the only method which can be applied in the most general case. By methods two and three the symmetry of the substitution parts remains but the income effects must be modified. Methods two and three apply only if assumptions are made regarding the way in which utility from saving and utility from consumption are related.

None of these devices yield a true income or a true substitution effect. In no case will income compensation exactly eliminate the new income effect as defined. True income and substitution effects can be defined but only at the cost of accepting the worst of both worlds. The magnitude of the true income effect is certainly not equal to the propensity to consume the good and it is impossible to say whether true substitution effects are symmetric or not. It can be demonstrated in fact that the true substitution effect is not symmetric in a special but more restricted case which will be introduced.

It is shown that the true income compensation is in general greater than the change in the Marshallian consumer surplus measured as the area under the demand curve. It has seemed worth while to develop this point since the concept of consumer surplus has been invoked, without the necessary modification, to infer the magnitude of changes in saving due to changes in price (2 and 7). Much of the argument of Professor J. E. Meade's path breaking work Trade & Welfare (1) also depends upon the same idea in a different form.

Because the separation of elasticities into income and substitution effects has developed into something more than a mathematical curiosum and now finds its place in arguments put forward in support of actual policy, an attempt has been made to make what follows intelligible to readers who may not wish to understand the detail. All important assumptions and conclusions are expressed in words as well as symbols and appeal is made to intuition where this seems likely to be helpful.

Demand analysis as normally set out assumes implicitly that all income is spent on consumption goods. The equation

$$y = \Sigma\, p_i x_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad \text{(i)}$$

is a key equation in the derivation of the Slutsky result. Where the nature of the problem under consideration has made it necessary to refer explicitly to saving, economists have tended, with certain notable exceptions and with varying degrees of uncertainty, to follow one or other of two lines. Money saving is regarded either as a residual so that,

$$s = y - \Sigma\, p_i x_i \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad \text{(ii)}$$

i.e. saving is the difference between income and expenditure; or equation (i) is supposed to hold, saving being regarded as just one of the x's (say x_j).

The first of these treatments is correct as far as it goes but it does not provide us with any explanation of the way in which the choice between saving and spending is made. We shall come back to this point. The second approach can be quite misleading as soon as we begin to ask questions about the nature of the demand equation. It is valid only as far as equation (i) can be regarded as an alternative way of writing equation (ii).

It is easy to see intuitively that the demand equation for money saving cannot have the same properties as the demand equation for any good and must therefore be separately considered. For, in the simple case where the individual has no accumulated titles to wealth to begin with, the doubling of all prices and income will leave the real situation unchanged. The consumer will buy precisely what he had planned to buy before the change but he will save twice as much in money terms. The quantity taken of the i^{th} good and money saving are both functions of prices and income but doubling prices and income will double money saving whilst leaving consumption of the i^{th} good unchanged. Mathematically the demand equation for the i^{th} good will will be homogeneous of order zero whilst the demand equation for saving will be homogeneous of order one.

Some readers may feel that the lost symmetry can easily be restored by defining x_j as *real* rather than money saving. Clearly in the example above real saving remains unchanged in exactly the same way as consumption. Unfortunately this still leaves us with no answer to the question, in what units should real saving be measured? It is circular argument to assert that real saving is merely money saving deflated by a suitable price index; for what is a suitable price index depends upon the solution of the very problem we are trying to evade—namely, what are the effects of price changes on money saving?

Of course the difference we have noted in the order of homogeneity of the saving and demand equations is in itself unimportant. It is a symptom rather than a cause and is introduced only to draw attention to the fact that a non trivial problem exists. In fact there is no reason to suppose that either consumption demand equations or the savings equation will be homogeneous at all in the general case where there exists accumulated titles to wealth, the money value of which does not double with the doubling of all prices. If the doubling of prices reduces the purchasing power of accumulated wealth savings may be more than

doubled in an effort to replace losses. Thus money spent cannot be doubled even though income is.

The basic difficulty is one which has been commented on many times before. The utility derived from consumption comes directly from the goods consumed. The utility from saving comes partly from interest earned, partly from the satisfaction that the power to command wealth for its own sake gives, and partly from goods which it is intended to purchase in the future. Clearly therefore on at least two counts, possibly three, the utility derived from saving depends on expected future prices, which will in all probability be related to current prices.

Traditional demand theory supposes that the current period's income will be laid out in such a way as to maximize a utility which depends solely upon the quantities $x_1 \ldots . x_n$ of goods consumed. But we have now shown that if some current income is to be put to saving the utility function to be maximized must depend also on expected future prices, the rate of interest, and on titles to wealth accumulated in past periods. In symbols we write

$$u = u\ (x_1 \ldots . x_n, q_1 \ldots . q_n, r, s, w,) \ . \ . \ .

The standard mathematical technique for maximizing any function subject to a constraint gives us $n + 1$ equations where n is the number of goods. These will be

$$\left.\begin{aligned} u_i &= \lambda p_i \ (i = 1, 2 \ldots . n) \\ u_s &= \lambda \end{aligned}\right\} \ldots . \text{(v)} \quad \begin{matrix} (u_i = \text{marginal utility of the } i^{th} \text{ good}) \\ (u_s = \text{marginal utility of money saving}) \end{matrix}$$

The first n equations are familiar and show simply that the marginal utilities of all goods must, in equilibrium, be proportional to their prices. The last equation is the additional equation required to determine the choice between saving and consumption. It indicates that saving will be carried to the point where its marginal utility is equal to the marginal utility of money, i.e. to the proportionality factor λ.

It is important to recognize that *all* of these $n + 1$ equations *and* equation (iv) are needed to be able to express the $n + 2$ variables x_i, s, λ as functions of the parameters p_i, q_i, r and w. We have already commented upon the shortcomings of the approach in which s is treated simply as a residual. It is now clear that s must be known before any of the x_i can be determined, so that s itself can never be determined solely from equation (iv).

All of this is very relevant to the approach to the problem devised by Professor J. E. Meade in the course of his work in the field of international trade. In effect Professor Meade proceeds as follows. Suppose that s is known and that we know also the way in which s depends on prices and money income. The equation $u_s = \lambda$ is then no longer required although of course our prior knowledge is not necessarily inconsistent with it. We can now solve for all x_i in terms of our parameters and s from the n equations $u_i = \lambda p_i$ and (iv) alone.

And if in addition we write (iv) as

$$y - s = c = \Sigma \, p_i x_i$$

we can proceed exactly as in the textbooks except that we replace income, y, with consumption, c, wherever it occurs.

The difference is that we can now no longer speak of elasticity of demand with respect to a change in any price, *everything else held constant*; for changing any price will in general also change consumption c. But we can write

$$\frac{dx_i}{dp_i} = \frac{\partial x_i}{\partial p_i} + \frac{\partial x_i}{\partial c} \frac{\partial c}{\partial p_i}$$

i.e. the *total* rate of change of x_i with respect to changes in the price p_i is equal to that part, $\dfrac{\partial x_i}{\partial p_i}$ which would occur if c were held constant plus the rate of change of x_i with respect to a change in consumption (prices constant) multiplied by the rate of change of consumption due to changes in p_i. (Money income constant.)

Moreover since $c = y - s$ and y is held constant

$$\frac{\partial c}{\partial p_i} = - \frac{\partial s}{\partial p_i}$$

so that

$$\frac{dx_i}{dp_i} = \frac{\partial x_i}{\partial p_i} - \frac{\partial x_i}{\partial c} \frac{\partial s}{\partial p_i}$$

It is evident also that because we have kept y constant $\frac{dx_i}{dp_i}$ is equal to the Marshallian partial derivative we require.

An unjustified step now follows. It is assumed that because the equations

$$u_i = \lambda p_i$$

and

$$c = \Sigma p_i x_i$$

have (apparently) the same form as the textbook equations, the partial $\frac{\partial x_i}{\partial p_i}$ can be split up into income and substitution effects as before, as long as we take care only to put c for y wherever it occurs. That is, it is supposed that we can write

$$\frac{dx_i}{dp_i} = -x_i \frac{\partial x_i}{\partial c} + \sigma_{ii} - \frac{\partial x_i}{\partial c}\frac{\partial s}{\partial p_i}$$

$$= -\left(x_i + \frac{\partial s}{\partial p_i}\right)\frac{\partial x_i}{\partial c} + \sigma_{ii}$$

If it is further assumed with Professor Meade that $\frac{\partial s}{\partial p_i} = o$ we have at once a neat and convenient sustitution and income effect. The substitution effect has the desirable symmetric property. The only difference is that the income effect is equal in magnitude to the proportion of an increase in *consumption* which would be spent on x_i rather than the proportion of an increase in *income*.

Using the fact that

$$y = c + s$$

or

$$\frac{\partial y}{\partial c} = 1 + \frac{\partial s}{\partial y}\frac{\partial y}{\partial c} = \frac{1}{1 - \frac{\partial s}{\partial y}}$$

we can also write

$$\frac{dx_i}{dp_i} = -\frac{1}{1-h}\left(x_i + \frac{\partial s}{\partial p_i}\right)\frac{\partial x_i}{\partial y} + \sigma_{ii} \quad \ldots\ldots\ldots \text{(vi)}$$

where h is the propensity to save $\frac{\partial s}{\partial y}$. In this form the modification due to saving is clearer.

Unfortunately the splitting $\frac{\partial x_i}{\partial p_i}$ *into income and substitution effect is invalid unless a further assumption is made.* Consider our utility function (iii). Total utility depends upon saving and hence marginal utility depends upon saving. The change in price p_i, therefore, will, via saving, change the shape and position of the utility function so that the textbook argument no longer holds. The Slutsky proof depends on the assumption that utility is independent of price. To validate our formula we require to impose some condition on the form of our new utility function u. A sufficient condition would, of course, be complete independence between utility from consumption

and utility from saving. This, however, is equivalent to saying that the possession of greater titles to wealth would have no effect at all upon the satisfaction derived from current consumption, an assertion which may be thought to contradict the basic hypothesis of diminishing marginal utility. Fortunately, as we shall see later from the mathematics, a weaker assumption is also sufficient. If it can be accepted that an increase in wealth will not affect the *relative* marginal utilities of goods in current consumption then the result (vi) still holds. To put it another way we suppose that the knowledge that a higher standard of living can be enjoyed in the future, does not affect the way in which any *given* current expenditure is distributed now. As a first approximation this may seem reasonable in certain contexts. We should not lose sight of the fact however that the certainty that, in ten years when we retire, we shall be able to afford a world tour, may very well induce us to take a short holiday this year in Sydney rather than in Europe. The difference in cost may be spent on other current luxuries. In this case (vi) does not hold since the division into income and substitution effects is no longer valid.

So far these propositions have been asserted only. It remains to prove them and to develop alternatives. As this can be done with only slight modifications to textbook methods only the briefest sketch of the proof will be given. Equations (iv) and (v) can be differentiated partially with respect to p_i to give

$$\Sigma\, p_j \frac{\partial x_j}{\partial p_i} + \frac{\partial_s}{\partial p_i} = -x_i$$

$$-p_i \frac{\partial \lambda}{\partial p_i} + \Sigma\, u_{ij} \frac{\partial x_j}{\partial p_i} + u_{is} \frac{\partial_s}{\partial p_i} = \lambda - u_{iqi} \frac{\partial q_i}{\partial p_i}$$

$$-p_k \frac{\partial \lambda}{\partial p_i} + \Sigma\, u_{kj} \frac{\partial x_j}{\partial p_i} + u_{ks} \frac{\partial_s}{\partial p_i} = -u_{kqi} \frac{\partial q_i}{\partial p_i} \quad (k = 1, 2.., n)$$

k is not equal to i

and $$-\frac{\partial \lambda}{\partial p_i} + \Sigma\, u_{sj} \frac{\partial x_j}{\partial p_i} + u_{ss} \frac{\partial_s}{\partial p_i} = -u_{sqi} \frac{\partial q_i}{\partial p_i}$$

u_{kqi} is the rate of change of marginal utility of the k^{th} good with respect to a change in the expected future price q_i. $\frac{\partial q_i}{\partial p_i}$ is the reaction of the expected future price to a current price change. From this point, to avoid continually writing the extra term, we assume that current prices and expected future prices are always the same so that $\frac{\partial q_i}{\partial p_i} = 1$. We have also assumed throughout that a change in the current price of any good will have no affect at all on any expected future price other than its own.

The matrix of co-efficients on the left can be seen to be the familiar bordered Hessian of the utility function u. Solution for any $\frac{\partial x_j}{\partial p_i}$ yields

(i) The usual income effect $-x_i\frac{\partial x_j}{\partial y}$. This may be confirmed by differentiating the original equations partially with respect to y, solving for $\frac{\partial x_j}{\partial y}$ and comparing with term one.

(ii) A substitution effect σ_{ji} possessing the symmetric property. This follows from the symmetry of the Hessian matrix.

(iii) A sum of terms of the type $-u_{kqi}\frac{\Delta_{kj}}{\Delta}$ *where* Δ_{kj} is the co-factor of the element u_{kj} in the Hessian determinant Δ.

The meaning of the sum of terms (iii) can be easily seen. If we differentiate our original equations partially with respect to q_i rather than p_i we have a set of equations as above except that $\frac{\partial x_j}{\partial p_i}$'s, become $\frac{\partial x_j}{\partial q_i}$'s, and the $-x_i$ and λ on the R.H.S. disappear. Solving for $\frac{\partial x_j}{\partial q_i}$ we obtain precisely the sum of terms (iii).

The Marshallian partial $\frac{\partial x_j}{\partial p_i}$ may thus be written.

$$\frac{\partial x_j}{\partial p_i} = -x_i\frac{\partial x_j}{\partial y} + \sigma_{ji} + \frac{\partial x_j}{\partial q_i} \quad \ldots\ldots\ldots \quad \text{(vii)}$$

The last term is the change which would result in the consumption of the j^{th} good following unit rise in the expected future price of the i^{th} good assuming all current prices and all expected prices other than q_i remain constant.

This result may be compared with the previous result

$$\frac{dx_j}{dp_i} = -x_i\frac{\partial x_j}{\partial c} + \sigma_{ji} - \frac{\partial x_j}{\partial c}\frac{\partial s}{\partial p_i}$$

For two reasons it must *not* be inferred that by subtraction we can now write

$$\frac{\partial x_j}{\partial q_i} = x_i\left(\frac{\partial x_j}{\partial y} - \frac{\partial x_j}{\partial c}\right) + \frac{\partial x_j}{\partial c}\frac{\partial s}{\partial p_i}$$

$$= \left(\frac{1}{1-h}\frac{\partial s}{\partial p_i} - \frac{h}{1-h}\,x_i\right)\frac{\partial x_j}{\partial y}$$

First the second result (vii) is quite general whereas the first depends on assumptions regarding the form of the utility function. Secondly the two σ_{ji} are not the same. In (vi) σ_{ji} does not contain any element of substitution into money saving whereas in (vii) it does. To maintain the distinction we shall therefore write the substitution effect in (vii) as $[\sigma_{ji}]_s$.

A property of the term $\frac{\partial x_j}{\partial q_i}$ should also be noted. Since

$$\Sigma\, p_i x_i + s = y$$

$$\Sigma\, p_j\frac{\partial x_j}{\partial q_i} + \frac{\partial s}{\partial q_i} = o$$

and multiplying by λ

$$\Sigma u_j \frac{\partial x_j}{\partial q_i} + \lambda \frac{\partial s}{\partial q_i} = o$$

This means that the changes in the disbursement of a given income induced by an increase in one expected future price do not in themselves imply any change in total utility. This is of course the essential property of the substitution effect $[\sigma_{ji}]_s$ for evidently

$$\Sigma p_j [\sigma_{ji}]_s + \sigma_{si} = o$$

We are free therefore to sum the two effects $[\sigma_{ji}]_s$ and $\frac{\partial x_j}{\partial q_i}$ calling the whole a substitution effect Γ_{ji} which will again have the property

$$\Sigma p_j \Gamma_{ji} + \Gamma_{si} = o$$

Thus we have shown that in general any Marshallian partial derivative of the demand function including the demand for money saving can be expresed as two terms

$$-x_i \frac{\partial x_j}{\partial y} + \Gamma_{ji} \quad \ldots \ldots \ldots \ldots \ldots \text{(viii)}$$

exactly as before except that the substitution term Γ_{ji} no longer retains its important symmetry, i.e.

Γ_{ji} is not equal to Γ_{ij}

This is clear since evidently $\frac{\partial x_j}{\partial q_i}$ is not equal to $\frac{\partial x_i}{\partial q_j}$

Regrettably also we have lost information about the sign of Γ_{ii}. We know from the usual stability argument that $[\sigma_{ii}]_s$ is always negative; but since we can never be sure of the sign of $\frac{\partial x_i}{\partial q_i}$ we know nothing about Γ_{ii}. Something might be recovered however on certain assumptions. It will be shown later that if we accept the restriction on the utility function referred to above then

$$\frac{\partial x_j}{\partial q_i} = -\frac{\partial s}{\partial q_i}\frac{\partial x_j}{\partial c} = -\frac{\partial s}{\partial q_i}\frac{\partial x_j}{\partial y}\left(\frac{1}{1-h}\right) \ldots \ldots \text{(ix)}$$

This means that any change in money spending due to a change in the expected future price q_i will be allocated among current consumption goods in the same proportions as if there had been an increase in income. And we are able to put a sign to $\frac{\partial s}{\partial q_i}$ as follows:

First we note that the utility assumption explained above (page 58), expressed in mathematical terms, gives

$$\frac{\partial \frac{u_i}{u_j}}{\partial q_i} = \frac{\partial \frac{u_i}{u_j}}{\partial s} = o$$

Which implies that $\left.\begin{matrix} u_{iq_i} = a\, u_i = \beta\, p_i \\ u_{jq_i} = a\, u_j = \beta\, p_j \end{matrix}\right\}$ and $\left.\begin{matrix} u_{is} = a'\, u_i = \beta'\, p_i \\ u_{js} = a'\, u_j = \beta'\, p_j \end{matrix}\right\}$ (x)

Now differentiating the equilibrium equations (iv) and (v) with

respect to q_i and solving as before for $\frac{\partial s}{\partial q_i}$ we obtain a numerator consisting of a determinant with (by the conditions (x)) the first and last columns proportional all but the last row. The whole may be seen to reduce to

$-(u_{sqi}+\beta)\frac{\Delta_o}{\Delta}$ where Δ_o is the leading principal minor of the Hessian determinant Δ.

Now all u_{iqi} on our assumptions must have the same sign, which will be positive; for increasing q_i reduces real well being which increases marginal utilities. Hence β is positive. Similarly u_{sqi} will be positive since decreasing the value of real saving will increase the marginal utility of saving. Again $\frac{\Delta_o}{\Delta}$ will be negative by the usual stability argument. Hence $\frac{\partial s}{\partial q_i}$ is positive. From (ix) it then follows that $\frac{\partial x_i}{\partial q_i}$ is negative as long as j is not an inferior good. Thus Γ_{ii} will always be negative.

This completes all that can be said of method one. By this method we have an income effect as in the Slutsky equation and a substitution effect which follows the usual sign rules on the assumption of modified independence of utility from saving and consuming. The substitution effect however is not symmetric.

It remains only to warn that, although $-x_i\frac{\partial x_j}{\partial y}$ is the income effect as before, x_i is no longer the compensating variation. If we change a price p_i by an amount dp_i the consumer will not be fully compensated by giving him a sum of money $x_i dp_i$. It is true that this sum of money would enable him to buy exactly what he bought before and to save, in money terms, what he saved before. But it would not compensate him for the loss in the real purchasing power of current saving and accumulated wealth. From the utility function we see that this loss is $\frac{\partial u}{\partial q_i}\frac{\partial q_i}{\partial p_i}dp_i$ which, in money terms, and on our assumptions regarding expected prices equals $\frac{1}{\lambda}\frac{\partial u}{\partial q_i}dp_i$. Hence the total compensation required is

$$\left(x-\frac{1}{\lambda}\frac{\partial u}{\partial q_i}\right)dp_i \quad \text{(xi)}$$

We could now, if we chose, define income effect as income compensation multiplied by minus $\frac{\partial x_i}{\partial y}$ and substitution effect as the remainder. But this is unlikely to be at all useful since both terms now contain non measureable entities and neither term has any of the properties that have been found so valuable. Geometrically we can think of the compensation $x_i dp_i$ as carrying the consumer back to the same indifference surface. But because of the change in q_i this indifference surface will

represent a lower level of satisfaction by the amount $\frac{\partial u}{\partial q_i}\ dp_i$. There will also have been a slight adjustment in the *shape* of the indifference surface, but the secondary adjustment of the x's and s due to this will have no effect on total utility.

We note also that $\frac{\partial u}{\partial q_i}$ will always be negative in sign. A rise in any expected future price will always reduce total utility as saving is now expected to buy less. Since λ is always positive it follows that the true income compensation (xi) must always be greater than the income compensation $x_i dp_i$ which applies when there is no saving. This leads us to another point relevant to the international trade arguments which inspired the present enquiry.

In two well-known articles (8, 9) Professor J. R. Hicks has attempted to rehabilitate Dupuit's celebrated concept of consumer surplus measured as the area under the demand curve less the quantity of money spent. He has argued that, as long as we are dealing only with small changes in this area, such changes will always give a measure of the income compensating variation up to a first degree of approximation even though we do not make Marshall's qualifying and unrealistic assumption that the marginal utility of money remains constant. It is easy to see from the foregoing that this is true only if there is no saving; for drawing a diagram it is evident that the change in consumer surplus, apart from a small triangle which is of second order smallness, must always be $x_i dp_i$ whether there is saving or not and whatever the slope of the demand curve. Professor Hick's theorem therefore does not hold where there is saving for $\frac{\partial u}{\partial q_i}$ is not second order. The connection between this and international trade theory lies in the use to which the concept of consumer surplus has been put in attempts to settle the sign of $\frac{\partial s}{\partial p_i}$.

It has been suggested by Professor H. G. Johnson, for example (10), that if there is no substitution effect $\frac{\partial s}{\partial p_i}$ will always be negative. The loss of real income induces a fall in saving. More precisely Professor A. C. Harberger has derived what is apparently a very neat and rather surprising result (2) by assuming that $\frac{\partial s}{\partial p_i}$ is equal to the loss of real income, measured by the income compensating variation taken as x_i multiplied by the propensity to save h. It has been shown elsewhere (7) by the present writer that Professor Harberger's assumption is equivalent to assuming $h = 1$, which is an absurd restriction on h. The basic cause of the contradiction is that the income compensating variation is normally greater than x_i. In fact it is clear that we cannot tell even the sign of $\frac{\partial p_i}{\partial s}$ on any *a priori* grounds; for from the above we know that it can be written

$$-x_i\frac{\partial s}{\partial y}+[\sigma_{si}]_s+\frac{\partial s}{\partial q_i}$$

It is true that we do not know the sign of $[\sigma_{si}]_s$ so that it is not unreasonable to assume it to be zero, but we have shown above that $\frac{\partial s}{\partial q_i}$ is always positive. It is worth noting also that there is likely to be a bias towards a positive substitution effect

$$\Gamma_{si}=[\sigma_{si}]_s+\frac{\partial s}{\partial q_i}$$

for it can be shown by an argument used by the present writer elsewhere (7) that if the marginal propensity to save equals the average propensity to save then

$$\Sigma\, p_i\frac{\partial s}{\partial p_i}=o$$

so that there must be at least one $\frac{\partial s}{\partial p_i}$ of each sign.

We turn now to the second method of writing the Marshallian partial. Consider the equation (ix)

$$-\frac{\partial s}{\partial q_i}\frac{\partial x_j}{\partial y}\left(\frac{1}{1-h}\right)=\frac{\partial x_j}{\partial q_i}$$

This relation has not yet been proved but it follows in a straightforward way, by differentiating the equilibrium equations (iv) and (v) successfully with respect to q_i, y and solving for $\frac{\partial s}{\partial x_i}$, $\frac{\partial q_i}{\partial y}$ and $h=\frac{\partial s}{\partial y}$. Substituting the results in the L.H.S. of (ix) and using the conditions (x) on the utility function we find that the whole reduces to the solution for $\frac{\partial x_j}{\partial q_i}$. We note at the same time that the proposition is *not* true except on conditions (x). If (ix) is accepted, however, we can, if we wish, allocate $\frac{\partial x_j}{\partial q_i}$ to the income effect term so that

$$-x_i\frac{\partial x_j}{\partial y}+[\sigma_{ji}]_s+\frac{\partial x_j}{\partial p_i}$$

can be written $$-\left(x_i+\frac{1}{1-h}\frac{\partial s}{\partial q_i}\right)\frac{\partial x_j}{\partial y}+[\sigma_{ji}]_s \quad \ldots\ldots\ldots \text{(xii)}$$

This may prove to be a particularly useful form of the Marshallian partial since we know $\frac{\partial s}{\partial q_i}$ is positive and hence that the income effect is of the same sign but numerically greater than the Slutsky income effect. The substitution effect obeys all sign rules and is symmetric.

Method 3 is that used by implication by Professor J. E. Meade. As we have already asserted our utility assumptions allow us to write (xii) also in the form

$$\frac{\partial x_j}{\partial p_i}=-\frac{1}{1-h}\left(x_i+\frac{\partial s}{\partial p_i}\right)\frac{\partial x_j}{\partial y}+\sigma_{ji} \ldots\ldots\ldots \text{(xiii)}$$

To prove this we state first that

$$-\frac{1}{1-h}\,[\sigma_{si}]_s\frac{\partial x_j}{\partial y} = [\sigma_{ji}]_s - \sigma_{ji} \quad \ldots\ldots\ldots\ldots \text{(xiv)}$$

This is the substitution effect counterpart of equation (ix) and can be compared with it. (ix) shows that our utility assumptions imply that any change in saving due to a change in an expected future price q_i will be allocated to consumption goods in the same proportion as an increase in income. (xiv) states that this is true also of the substitution part $[\sigma_{si}]_s$ of the change in saving.

(xiv) is rather more tedious to prove than (ix) but the method follows the same lines. σ_{ji} is obtained in the same way as $[\sigma_{ji}]_s$, that is by differentiating partially the equilibrium equations (iv) and (v) and solving *but this time keeping s constant in the process.* The expression thus obtained will be similar to that for $[\sigma_{ji}]_s$ except that the determinants in both numerator and denominator are now without the border $1, \ldots. u_{sj} \ldots., u_{ss}$. We note also that

$\Sigma\, p_j\,[\sigma_{ji}]_s + \sigma_{si} = o$ and $\Sigma\, p_j\,\sigma_{ji} = o$ so that $\Sigma\, p_j\,([\sigma_{ji}]_s - \sigma_{ji}) = -\sigma_{si}$

$[\sigma_{ji}]_s$ is the total substitution from all sources into j. σ_{ji} is substitution into j from all sources except saving. Their difference is that part of saving allocated to j. The sum of all such differences is the total substitution out of saving $-\sigma_{si}$.

It will be seen that the bordered Hessian determinant can be converted at once into the unbordered Hessian determinant by multiplying by $1-h$ and using the conditions (x). This facilitates the reduction of the R.H.S. of (xiv). Applying the conditions (x) to the L.H.S. also, (xiv) can be shown to be an identity.

If we now break down the $\dfrac{\partial s}{\partial p_i}$ of (xiii) into its component parts

$$-x\,h + \sigma_{si} + \frac{\partial s}{\partial q_i}$$

and use (xiv), (xiii) and (xii) are seen to be identical also.

The form (xiii) of the Marshallian partial has already proved its usefulness in economic theory. It is essential however, to be aware of the assumptions upon which it is based and of the dangers of treating $\dfrac{\partial s}{\partial p_i}$ as if it were itself a Marshallian partial which can be split into income and substitution effects (7).

Finally it may be worth while to refer briefly to another possible approach to the whole problem which, whilst it is more restrictive and in many ways less helpful, gives a better insight into the nature of the difficulty which we have to face. It could be assumed that the individual at the moment of saving makes a plan of future as well as current expenditure and that all utility from current income and accumulated wealth stems from that plan. That is, the consumer maximizes a function

$$u = u\,(x, \ldots. x_n, z_1 \ldots. z_n)$$

where z_i is the intended *future* consumption and x_i the current consumption of the i^{th} good.

The budget constraint will be

$$y + w = \Sigma\, p_i x_i + \Sigma\, q_i z_i$$

where w is, as before, wealth accumulated to date.

If this is worked through on the usual lines we find that the Marshallian partial now breaks down into two income effects and two substitution effects in a way similar to, but not precisely the same as, in Dr. Leser's modified Slutsky equation (6).

We have in fact

$$\frac{\partial x_j}{\partial p_i} = -x_i \frac{\partial x_j}{\partial y} - z_i \frac{\partial x_j}{\partial y} + \sigma_{xj\,pi} + \sigma_{xj\,qi} \quad \ldots\ldots \text{(xv)}$$

This is a much more intuitively acceptable result than any so far obtained. We have a Slutsky substitution and income effect due to the current price change and a similar substitution and income effect due to the expected future price change. $(x_i + z_i)$ is now, in a sense, a true income compensating variation but we have a serious difficulty. For whilst an increase in income of that amount would completely compensate for losses in utility from consumption and wealth accumulated to date, it does not take into account the loss of purchasing power of *future* savings. The income effect also involves a term z_i, the intended future consumption of the good. This is a difficult entity to measure even if the consumer could be said to be fully conscious of it.

Again the substitution part $(\sigma_{xj\,pi} + \sigma_{xj\,qi})$ does not have the symmetric properties we would like; for the substitution part of $\frac{\partial x_i}{\partial p_j}$ will be $(\sigma_{xi\,pj} + \sigma_{xi\,qj})$ and whilst $\sigma_{xj\,pi}$ and $\sigma_{xi\,pj}$ are equal, $\sigma_{xj\,qi}$ and $\sigma_{xi\,qj}$ are not.

We could of course go on to develop expressions for the savings partials $\frac{\partial s}{\partial p_i}$, since saving to date is merely the total of intended expenditure on goods z. But because of the difficulties already noted this will not lead to results which seem likely to be useful in any way. The general method is introduced only for the sake of completeness and because the intuitively plausible result (xv) serves to confirm the more general argument above.

Conclusions

The breaking down of the Marshallian elasticity of demand into Slutsky income and substitution effects, a device which is rapidly assuming importance in the theory of international trade, is strictly speaking invalid in macro economic arguments where saving is a key feature of the discussion.

Nevertheless it is possible to express elasticity as the sum of two terms, the old Slutsky income effect plus a quasi substitution effect. This quasi substitution effect however will no longer obey the important rules of sign and symmetry which govern the Slutsky substitution effect.

On the assumption that a small change in saving will have no effect upon the way in which any *given* current expenditure is disbursed it is possible to reinstate the rules of sign but not the rule of symmetry.

On the above assumption also, alternative ways of writing the Marshallian partial are possible both of which have substitution effects which obey the sign and symmetry rules. In each case however, a useful property of the income effect is lost. The income effect part of demand elasticity is no longer equal in magnitude to the proportion of an increase in money income which would be spent on the good. In the form which has been used implicitly by Professor J. E. Meade in his important contributions to the theory of International Trade, even the sign of the income effect cannot be deduced on *a priori* grounds.

The problem cannot be evaded by defining demand as dependent upon prices and consumption rather than prices and income as is coming to be common practice. The price elasticity of demand (consumption constant) cannot, as has elsewhere been assumed, be broken down into Slutsky income and substitution effects unless the restrictions referred to above are imposed upon the form of the consumer's utility function.

The change in the area under the Marshallian demand curve due to a small change in price is not in general a measure of the income compensating variation if the consumer saves.

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COMPARATIVE PRODUCTIVITY IN MANUFACTURING INDUSTRY: A CASE STUDY OF AUSTRALIA AND CANADA*

1. *Introduction*

In an earlier article in this Journal, the secular rate of growth in Australia of the physical volume of manufacturing production per man-hour over the past 40 years was approximately estimated.[1] The results there established can conveniently be compared with similar estimates for many other countries which are available in the extensive literature on labour productivity.[2] Broadly speaking, it would seem that the rate of Australian progress in this respect has been less than in North America, but not very different from that in the industrially advanced countries of Western Europe. Further progress in the development of relevant index numbers of manufacturing production and productivity in Australia would allow of continuous comparisons to be made in future between Australia's progress and that in other areas of the world.

What has not been attempted so far, however, is an assessment of Australian manufacturing productivity at any given time in relation to that of other countries. Indeed, it is also true to say that no comprehensive and detailed study has yet been made for any group of countries of comparative industrial productivity in the post-war period. Some very valuable analysis has, however, been made by the O.E.E.C. Secretariat of relative net values of industrial production in 1950 for the several member-countries of O.E.E.C. and for the United States, but only overall comparisons were aimed at.[3] This was perhaps inevitable, since the O.E.E.C. approach was *via* an analysis of national expenditure. The only detailed industry analysis of comparative labour productivity that has so far been made is contained in the pioneering work of the late Dr. L. Rostas, relating to the position in the late 1930's in the United Kingdom, the United States, Germany and several other industrial countries in Europe.[4]

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1. A. Maizels, "Trends in Production and Productivity in Australian Manufacturing Industries", *Economic Record*, August, 1957.

2. See, in particular, Colin Clark, *The Conditions of Economic Progress* (3rd edition, 1957), Ch. VI.

3. V. Paretti and G. Bloch, "Industrial Production in Western Europe and the United States, 1901 to 1955", *Banca Nazionale del Lavoro Quarterly Review*, December, 1956.

4. Since the present article was written, a detailed comparison of productivity in British and Canadian industries has been made by Mr. J. B. Heath ("British-Canadian Industrial Productivity", *Ec. Journ.*, LXVII, Dec. 1957).

The present article compares industrial productivity in Australia in 1950-51 with that in Canada in 1950. The comparisons were confined to two countries so as to limit the amount of detailed statistical work involved. The choice of another country to compare with Australia was somewhat arbitrary; for many purposes, for example, a comparison of Australia with the United Kingdom would have been of great interest. Canada was, however, chosen as being in many ways more comparable with Australia in the field of economic growth generally: both are countries of relatively recent settlement, both developed secondary industries alongside large-scale primary production, both have depended on foreign capital investments for a significant part of their industrial growth, and both have "Western-type" economic and social institutions.

The inter-country comparisons given below are based entirely on material published in national Censuses of Manufactures. The methods used can readily be extended to other countries for which detailed Census information is available. The results given here should therefore be taken as illustrative of the method outlined below. Essentially, the method is a modification of that adopted by Rostas, and some words of explanation are therefore required before the detailed results are presented.

2. *Method*

Dr. Rostas' first publication of his results was contained in a famous article in the *Economic Journal* in 1943.[5] He showed there fairly conclusively that by the late 1930's output per head (or per man/hour) in the United States was double, or more than double, the corresponding figure for Britain in a wide range of manufacturing industry. These results aroused widespread interest in Britain and intense public discussion resulted. In a real sense, Rostas can be considered the intellectual father of the post-war productivity drive in Britain, while his subsequent influence as the United Kingdom representative on productivity questions at the O.E.E.C. was also substantial.

There was, however, a minority of opinion which cast doubt on the validity of Rostas' methods.[6] The method he used was to express the entire output of a given trade in terms of a single selected product. His own version of the method was as follows:

> "Where the trade to be compared produced more than one commodity (say coke or gas) or different types of the same commodity (shoes for men and women), they were converted into one homogeneous product, either on the basis of physical weights (as in the case of steel products) or on the basis of their relative values (as in the case of different kinds of shoes or motor-cars)."[7]

5. L. Rostas, "Industrial Production, Productivity and Distribution in Britain, Germany and the United States", *The Economic Journal* (April, 1943).

6. See E. C. Snow, "The International Comparison of Industrial Output" (Inaugural Presidential Address to the Royal Statistical Society), published in *J.R. Statis. Soc.*, CVII (Part I, 1944), and the subsequent discussion in the same Journal.

7. *Economic Journal*, 1943, p. 46.

The use of relative (unit) values to "convert" different products into a homogeneous unit was necessarily the main method used by Rostas; the alternative weight basis could be used in only a very limited number of industries where production was concentrated on virtually a single product. Rostas himself believed that relative *net* values of production were the correct "weights" to use for this conversion process, and that relative gross unit values were the best approximation available.[8]

The practical difficulty with this method is that the answer is influenced by the particular commodity selected as the standard of reference.[9] It will assist the subsequent discussion if this method is set out algebraically.

Comparing the output of the same trade in country i and country j, we have $p_{1i}, p_{2i}, \ldots p_{ni}$ for the prices of individual commodities produced in the trade in country i; $q_{1i}, q_{2i} \ldots q_{ni}$ for the corresponding quantities, and p_{1j}, etc., q_{1j}, etc., for the comparable output in country j. Then, the Rostas "equivalent unit" expressed in terms of commodity 1 is:

$$\left.\begin{aligned} Q_i &= q_{1i} + q_{2i}\left(\frac{p_{2i}}{p_{1i}}\right) + \ldots. q_{ni}\left(\frac{p_{ni}}{p_{1i}}\right) \\ \text{and} \quad Q_j &= q_{1j} + q_{2j}\left(\frac{p_{2j}}{p_{1j}}\right) + \ldots. q_{nj}\left(\frac{p_{nj}}{p_{1j}}\right) \end{aligned}\right\} \ldots\ldots (1)$$

where Q_i and Q_j are the "equivalent units" of production in countries i and j, respectively.

Had commodity 2 been taken as the standard of reference, however, we should have Q_i' and Q_j', using p_{2i} and p_{2j} as the respective divisors.

It is evident that the ratios $\frac{Q_i}{Q_j}$ and $\frac{Q_i'}{Q_j'}$ will be equal only if the price relatives $\frac{p_{1i}}{p_{1j}}$ and $\frac{p_{2i}}{p_{2j}}$ are also equal. Where the relative prices of commodities produced differ as between countries—and this must be accepted as the normal case—the relation between the outputs of "equivalent units" may differ substantially, according to the commodity chosen as the standard of reference.

This difficulty was overcome by Rostas in his later book,[10] which contained his final revisions and conclusions. In the book, *two* "equivalent" units were computed for each country, wherever possible, one on the basis of that country's relative unit values, and the other on the basis of the other country's relative unit values. Both related to the same commodity as the standard of reference.

8. *J.R. Statis. Soc.*, 1944, p. 39. It is clear, however, from the discussion in a United Nations study (*Index Numbers of Industrial Production*, 1950) that the theoretically correct weighting would be man-hours per unit of output.

9. This was pointed out by Snow, *J.R. Statist. Soc.*, 1944, p. 8.

10. L. Rostas, *Comparative Productivity in British and American Industry*, Cambridge University Press, 1948.

Thus, the comparisons on the basis of the relative unit values of country i gives the following results:

$$\left.\begin{aligned} Q_i &= q_{1j} + q_{2j}\left(\frac{p_{2i}}{p_{1i}}\right) + \ldots\ldots q_{ni}\left(\frac{p_{ni}}{p_{1i}}\right) \\ \text{and } \overline{Q}_j &= q_{1i} + q_{2i}\left(\frac{p_{2i}}{p_{1i}}\right) + \ldots\ldots q_{nj}\left(\frac{p_{ni}}{p_{1i}}\right) \end{aligned}\right\} \ldots\ldots (2)$$

where both Q_i and $\overline{Q}_j$ are expressed in terms of commodity 1. Simiarly, the use of the relative unit values of country j results in $\overline{Q}_i$ and Q_j, again in terms of commodity 1.

It should, however, be noticed that the commodity chosen as the standard of reference disappears when the *ratio* of Q_i and $\overline{Q}_j$ is considered. Formulae (2) can be re-written as:

$$\left.\begin{aligned} Q_i &= \frac{\Sigma(p_{ri}q_{ri})}{p_{1i}} \\ \text{and } \overline{Q}_j &= \frac{\Sigma(p_{ri}q_{rj})}{p_{1i}} \end{aligned}\right\} \ldots\ldots\ldots\ldots (3)$$

From (3) we can derive two volume index numbers, as follows:

$$\left.\begin{aligned} \frac{Q_i}{\overline{Q}_j} &= \frac{\Sigma(p_{ri}q_{ri})}{\Sigma(p_{ri}q_{rj})} \\ \text{and } \frac{\overline{Q}_i}{Q_j} &= \frac{\Sigma(p_{rj}q_{ri})}{\Sigma(p_{rj}q_{rj})} \end{aligned}\right\} \ldots\ldots\ldots\ldots (4)$$

using i and j relative values, respectively, as weights.

Thus, though different absolute figures of "equivalent units" would result from the selection of different commodities as standards of reference, the *ratio* of the figures for the two countries would be unchanged. The ambiguity in the comparison of national outputs, which on Rostas' first method depended on the arbitrary selection of a commodity-standard of reference, now depends on the difference between the two sets of weights.[11]

It is, however, possible to proceed one stage further in the analysis by dividing the ratio of the values of output in national currencies in the two countries by the volume index which we now have. Thus, using the volume index incorporating i weights, we can write:

$$e_j = \frac{\Sigma(p_{ri}q_{rj})}{\Sigma(p_{rj}q_{rj})} \ldots\ldots\ldots\ldots\ldots (5)$$

which is the rate of exchange, as implied in the calculation, between the currencies of i and j. In fact, e_j is a weighted index of i and j output prices, using j values as weights. Similarly, we have:

$$e_i = \frac{\Sigma(p_{ri}q_{ri})}{\Sigma(p_{rj}q_{ri})} \ldots\ldots\ldots\ldots\ldots (6)$$

11. It should be noted that $\frac{Q_i}{\overline{Q}_j}$ and $\frac{\overline{Q}_i}{Q_j}$ are the exact counterparts of the Paasche and Laspèyres volume index numbers familiar in the analysis of time series. Similar formulae have recently been used for inter-country comparisons of consumer expenditure (see M. Gilbert and I. Kravis, *An International Comparison of National Products and the Purchasing Power of Currencies*, O.E.E.C., Paris).

by dividing the value ratio in national currencies by the other volume index.[12]

These implied exchange rates relate to unit values of gross output, and can be termed *gross* exchange rates. There are corresponding *net* exchange rates, which can be obtained in theory by dividing the ratio of net values of production in national currencies by the two indices of the volume of net production. The net rates can then be written:

$$e'_j = \frac{\Sigma(p_{ri}q_{rj}) - \Sigma(\pi_{ri}\mu_{rj})}{\Sigma(p_{rj}q_{rj}) - \Sigma(\pi_{rj}\mu_{rj})} \quad \ldots\ldots\ldots\ldots \quad (7)$$

using j relative weighting, and

$$e'_i = \frac{\Sigma(p_{ri}q_{ri}) - \Sigma(\pi_{ri}\mu_{ri})}{\Sigma(p_{rj}q_{ri}) - \Sigma(\pi_{rj}\mu_{ri})} \quad \ldots\ldots\ldots\ldots \quad (8)$$

using i relative weighting, π and μ representng unit values and quantities of materials input, respectively, in the two countries concerned.

The corresponding indices of the volume of net production can be defined as

$$\frac{V_i}{V_j} \cdot \frac{1}{e'_j} \text{ and } \frac{V_i}{V_j} \cdot \frac{1}{e'_i}$$

according to the set of weights used, where V represents the total value added. Taking only the latter formula, for the sake of simplicity, we have:

$$\frac{V_i}{V_j} \cdot \frac{1}{e'_i} = \frac{\Sigma(p_{ri}q_{ri}) - \Sigma(\pi_{ri}\mu_{ri})}{\Sigma(p_{rj}q_{rj}) - \Sigma(\pi_{rj}\mu_{rj})} \cdot \frac{\Sigma(p_{rj}q_{ri}) - \Sigma(\pi_{rj}\mu_{ri})}{\Sigma(p_{ri}q_{ri}) - \Sigma(\pi_{ri}\mu_{ri})}$$

$$= \frac{\Sigma(p_{rj}q_{ri}) - \Sigma(\pi_{rj}\mu_{ri})}{\Sigma(p_{rj}q_{rj}) - \Sigma(\pi_{rj}\mu_{rj})} \quad \ldots\ldots\ldots\ldots \quad (9)$$

In practice, however, it may not be possible to compute net volume index numbers of this type. For many countries, the published Census details for purchases of materials and fuel are insufficent for such a calculation. In the present set of comparisons, net volume index numbers were computed for only three industries out of twenty-one; in several cases the published information was not in sufficient detail, while in the remainder no detail was given by one or other country. For the majority of the industries taken, therefore, it was necessary to arrive at a reasonably good approximation to the true net volume indices. There are several alternatives open. One can, for example, assume that the ratio of materials prices in the two countries was not significantly different from the ratio of output prices, taking each industry-comparison separately. In view of the paucity of data on materials consumption in the reports on many of the Australian industries investigated, this assumption seemed generally the best one to make. The obvious alternative of assuming that materials prices were in the same ratio as the official exchange rate was clearly inadmissible on the internal evidence of the enquiry; this point is further discussed below. There is, however, a further alternative procedure available in

12. Formulae (5) and (6) correspond to the Laspèyres and Paasche unit value index numbers of time series analysis.

several cases, namely to use whatever information *is* available about materials consumption, however sparse this may be, and to assume that the price-relationship revealed by this sample is representative of materials consumption as a whole. Whether this is better or worse than the first assumption is largely a matter of judgment in each case; but clearly the detail for a substantial proportion of materials consumption would have to be available for this third alternative to be considered seriously. In the event, the third alternative was used for one industry-comparison only (brewing).

In what follows, the first assumption (that the materials price ratio did not differ significantly from the output price ratio) has been taken as the general case. We can now divide the ratio of *value added* (in national currencies) in the two countries by the *gross* exchange rates. This yields (using i-weighted rates):

$$\frac{V_i}{V_j} \cdot \frac{1}{e_i} = \frac{\Sigma(p_{ri}q_{ri}) - \Sigma(\pi_{ri}\mu_{ri})}{\Sigma(p_{rj}q_{rj}) - \Sigma(\pi_{rj}\mu_{rj})} \cdot \frac{\Sigma(p_{rj}q_{ri})}{\Sigma(p_{ri}q_{ri})}$$

$$= \frac{\Sigma(p_{rj}q_{ri}) - \Sigma(\pi_{ri}\mu_{ri}) \cdot \dfrac{\Sigma(p_{rj}q_{ri})}{\Sigma(p_{ri}q_{ri})}}{\Sigma(p_{rj}q_{rj}) - \Sigma(\pi_{rj}\mu_{rj})} \quad .. \quad (10)$$

It is evident that (10) is identical with (9) only if the ratio of output prices in the two countries is the same as that of materials prices,

i.e. if $e_i = \eta_i$

$$\text{where } \eta_i = \frac{\Sigma(\pi_i\mu_i)}{\Sigma(\pi_j\mu_i)}$$

Even if this equality does not hold exactly, the approximation arrived at by using (10) is likely to be a superior measure of the relative volume of output than is (4), since the former makes some allowance for the different degrees of fabrication carried out in the two countries, while the latter makes none. On *a priori* grounds one would not expect e_i and η_i to be identical, but it seems reasonable to suppose that they will not differ by an amount sufficient to invalidate the broad comparisons made below. However, it is useful to distinguish indices based on formula (10) from genuine net volume indices such as (9), and for this reason the former are here termed *modified net* indices. For those industries for which genuine net volume indices can be computed, a direct comparison of the e and η indices can be made; the results (given below) seem to give support to the assumption made.

In the above discussion, it has implicitly been assumed that the degree of duplication in the recorded output of similar industries is the same in both countries. This may, however, be very far from being the case, particularly where integrated firms are the rule in one country while specialist firms predominate in the other. It follows, therefore, that (unless this duplication can be eliminated in both cases), the difference between net and gross volume indices is influenced by differences in the extent of duplication as well as by differences in the degree of fabrication, as mentioned earlier. It can be assumed that, in general,

the net volume index is not affected by differences in the degree of duplication.[13] As will be seen later, the disparity between the proportion of duplicated sales in total output may be so great, comparing one country with the other, that no meaning can be attached to the inter-country comparison of gross volume indices for certain industries.

In the next section, detailed comparisons are made, for a selection of industries, of the relative physical productivity of labour, both on a gross and on a modified net basis. An explanation of the different levels of production in terms of labour input and the degree of mechanization is attempted.

Finally, labour-productivity differences between Canada and Australia are examined for the manufacturing sector as a whole and for each main industry-group separately. If we assume here (the point is discussed further in section 5), that the selected industries in any industry group are generally representative, as regards exchange rates, of the whole of that group, we can then divide the ratio of value added (in national currencies) for the industry group by the mean gross rate as indicated by the sample. We then have

$$\frac{(V_i)_t}{(V_j)_t} \cdot \frac{1}{(e_i)_s} = \frac{\Sigma(p_{ri}q_{ri})_t - \Sigma(\pi_{ri}\mu_{ri})_t}{\Sigma(p_{rj}q_{rj})_t - \Sigma(\pi_{rj}\mu_{rj})_t} \cdot \frac{\Sigma(p_{rj}q_{ri})_s}{\Sigma(p_{ri}q_{ri})_s} \quad .. \quad (11)$$

where t represents the total for the industry group and s the total for the sample of industries in the group. A related index is derived by using $(e_j)_s$ instead of $(e_i)_s$.

The assumption of representativeness implies that the ratio of the gross output of the sample industries to the gross output of the industry group is the same, whether valued at i prices or at j prices.

$$\text{Thus, if } \frac{\Sigma(p_{ri}q_{ri})_s}{\Sigma(p_{ri}q_{ri})_t} = \frac{\Sigma(p_{rj}q_{ri})_s}{\Sigma(p_{rj}q_{ri})_t},$$

$$\text{then } \frac{(V_i)_t}{(V_j)_t} \cdot \frac{1}{(e_i)_s} = \frac{(V_i)_t}{(V_j)_t} \cdot \frac{1}{(e_i)_t}$$

which again is identical with the true net volume index for the industry group if $e_i = \eta_i$. This last condition does not, of course, arise for those industries for which true net volume indices can be calculated.

In section 5 below, this procedure (i.e. formula (11) and the corresponding formula derived from $(e_j)_s$) has been followed to estimate the relative physical product per head in Canada and Australia, for each main industry group and for manufacturing as a whole. It must not be forgotten that the method is largely based on the two assumptions discussed above. Neither assumption is likely to be precisely true in practice, though both may perhaps be sufficiently near the mark to allow the results to be taken as reasonable indicators of the orders of magnitude involved.

3. *Relative Productivity of Labour in Australia and Canada*

From the Censuses of Manufactures of Australia and Canada,

13. For a discussion of how the net volume index can be so affected, see H. Leak and A. Maizels, "Note on Dr. Geary's Paper", *J.R. Statis. Soc.*, 1944, pp. 259-261.

detailed output comparisons have been made for 21 industries. This is virtually the limit to which such comparisons can be taken for fairly reliable results to be obtained. The difficulties are numerous. First, some general limitations. It is evident that genuine comparisons can be made only where the structure of industry is similar (or, at least, not very dissimilar) in the two countries. Where, for example, an industry consists of fully integrated plants in one country, but in the other specialist firms dominate each stage of production, comparisons may well be misleading, unless full allowance is made for differences in duplicated sales or, alternatively, the comparisons are confined to specific processes. Another difficulty (which, in some cases, arises out of the first) is that the statistical classification of industries may be significantly different, so that inter-country comparisons cannot readily be made. Thirdly, even where both structure and classification requirements are met, the degree and type of detail provided under the different commodity headings may differ sufficiently to prevent the statistical calculations from being made.

In the comparisons attempted here, it was found that all three of these difficulties were of importance. The structure of the wool textile industry, for example, in Canada is not the same as in Australia. An important process in Australia is the scouring of greasy wool on a commission basis, whereas this is not of any great importance in Canada. In cotton textiles, too, it would be wrong to assume that the Canadian industry is integrated to the same extent as in Australia. The same point holds in the important iron and steel industry. In the chemical fertilizer industry, the degree of duplication in the Australian gross output figures appears to be substantially greater than in the comparable Canadian industry, and this no doubt reflects a much smaller degree of integration in the former case.

The second difficulty, differences in industrial classification, prevented many comparisons being made that might well have been interesting and useful.

However, it was the third difficulty which proved to be the main obstacle. It should be said that this difficulty (differences in statistical headings and degree and type of detail provided) arose from two separate causes. First, in some cases the relative stage of development of a given industry was markedly different in the two countries, and this resulted—understandably—in sufficient detail being published in the one case but not in the other. Secondly, and this was easily the most widespread difficulty, the degree of detail in the Australian *Secondary Industry Bulletins* was usually considerably less than in the corresponding Canadian publication. Indeed, in many instances, comparisons had to be abandoned because of insufficient detail in the Australian published information. The Canadian Census, on the other hand, is very nearly a model of perfection from this point of view.

Next, an important qualification must be made with regard to differences in the *quality* of similar goods produced in the countries being compared. Such quality differences are largely left out of comparisons based on Census material, in so far as they relate to goods of similar

description in the Census statistics; in some cases, however, some allowance can be made where separate varieties of a commodity are distinguished. A good example, perhaps, occurs in the Brewing industry. In 1950 (1950/51 for Australia), exactly the same quantity of beer (171 million gallons) was brewed in Canada as in Australia; however, of the Canadian output, three-quarters was bottled or canned beer, while of the Australian total only one-fifth was bottled. (There was, in fact, a serious shortage of bottled beer in Australia in that year.) Allowing for the extra processing involved in bottling or canning, as reflected in relative prices, Canadian output in that year was not far short of 50 per cent greater, in volume terms, than in Australia.

There may well be other cases, of course, where differences in the degree of processing are not so readily revealed by the Census figures. A particular type of "processing" which may be of some general importance is packaging and advertisement of products, which one might reasonably expect to have been more highly developed in Canada than in Australia. If so, then the relative volume indices based on the published Census data would have a general bias in Australia's favour. This should be kept in mind when interpreting the results given below.

Finally, there is an inherent difficulty in comparing the *quantum* of labour input in two countries on the basis of Census figures. No adequate allowance can be made for differences in effort or skills applied; a crude allowance could be made by "converting" women and young persons to "equivalent men", but this process does not fully meet the problem. No allowance for differences in age and sex composition has, in fact, been made here; from an examination of the figures, it would seem that such an allowance would in any case leave the broad conclusions undisturbed. A more subtle difficulty arises from differences in the definition of the labour force. The most important difference is the inclusion in the Canadian figures of outside sales staff, who are excluded from the scope of the Australian census. This results in a considerable distortion when crude comparisons of the published figures are made for certain trades (the Bread trade is the outstanding case, since the Canadian total includes a substantial number of roundsmen, who must be excluded before a comparison with Australia can be made).

In view of these various difficulties of comparison, the results presented here must be taken as indicating *broad orders of magnitude only.*

The results of the comparisons of individual industries are given in Table I. This table shows gross value of production and value added, as well as the relative gross volume of production and production per head. For the four industries where the degree of duplication is known (or is suspected) to differ significantly, no volume indices are given on a gross basis to avoid possible misleading comparisons.

The gross volume indices have been computed by using as weights the relative values of output of individual commodities, first of Canada and then of Australia. Thus, they correspond to formula (4) discussed earlier. As already mentioned, net volume indices have been computed for three industries (flour-milling, brewing, hosiery), using formula

TABLE I

Relative Production and Productivity in Selected Industries in Canada and Australia

Industry	Gross Value of Production[1]		Value Added[1]		Production Index for Canada[2]		Production per head Index for Canada[2]	
	Canada	Australia	Canada	Australia	Gross[3]	Modified Net[4]	Gross[3]	Modified Net[4]
	($ mill.)	(£A mill.)	($ mill.)	(£A mill.)	(Australia = 100)			
Food and Drink								
1. Flour milling	247·1	40·5	31·8	5·6	120	115*	120	115*
2. Bread, Cakes, etc.	214·6[5]	36·8	98·4[5]	14·9	95	90	85	80
3. Biscuits	60·7	7·5	31·6	3·6	160	170	130	140
4. Butter, Cheese, etc.	408·2[6]	73·9	93·2[6]	10·8	120–125	165	80	110
5. Soft Drinks	87·1	9·9	52·0	4·7	170–175	215	110–115	140
6. Beer	149·4	18·4	105·1	8·5	140–150	145–155*	95–100	95–105*
Textiles and Clothing								
7. Cotton textiles[7]	257·4[8]	23·5	95·3	7·1	..	500	..	160
8. Wool textiles	157·4	73·4	60·6	18·6	..	100	..	140
9. Synthetic woven fabrics ..	88·6	4·8	53·2	2·3	965–975	1155–1210	200–205	240–250
10. Hosiery[9]	56·1	12·3	35·1	5·8	190–200	265–295*	140–145	190–215*
11. Corsets, etc.	15·4	4·1	8·7	1·8	170–175	220–230	160–165	210–215
Chemicals and allied trades								
12. Soap	66·0[10]	11·3	30·2	4·6	140–145	155–165	130–135	145–155
13. Paints, varnish, etc.	83·6	16·7	38·0	5·5	205	280–285	150	205–210
14. Fertilizers	69·0	18·8[11]	33·7	4·3	..	310–360	..	380–445
Metals and Metal Goods								
15. Iron and Steel	340·5	65·1	154·5	16·6	..	190–200	..	90
16. Wire-drawing	32·8	7·0	17·5	3·0	120–135	150–165	145–155	170–190
17. Heating and Cooking Apparatus	73·4	7·3	42·0	4·0	250–295	260–310	140–160	145–170
Miscellaneous								
18. Cement	38·2	6·5	23·1	2·5	210	225	270	290
19. Leather Footwear	100·3	25·3	46·3	12·3	150–155	145–150	160–165	155–160
20. Brushes and Brooms	16·2	4·1	8·7	1·7	130–160	175–205	110–135	145–170
21. Tobacco	122·4	21·6[12]	59·4	4·9	255–260	255–260[13]	150–155	150–155[13]

* Net volume indices, using formula (9). (1) For some industries the figures have been adjusted to ensure comparability as regards commodity-coverage. All figures exclude excise duty. (2) All indices are rounded to nearest 5. (3) See formula (4). (4) See formula (10). (5) Exclusive of outside delivery staff, gross value is estimated at about $178 million and value added about $69 million. (6) Exclusive of outside delivery staff, gross value may have been in the region of $390-$395 million, and value added in the region of $78 million. See also footnote (3) to Table II. (7) Excluding thread. (8) Excluding grey cloth sales within the trade, gross value = $232.2 mill. (9) Excluding underwear. (10) Including synthetic detergents and toilet preparations (8.7 and 6.7 mill., respectively) both of which are negligible in Australian total. (11) Including substantial duplicated sales of superphosphate and ground phosphate. (12) Including import duty on leaf tobacco. (13) Assumed equal to gross index.

(9); for the other industries (except tobacco), modified net volume indices were constructed, using formula (10). For tobacco, the net calculation was not found possible because of the different incidence of import and excise duties in the two countries, and in this case the net volume has been assumed equal to the gross volume. In many industries, the differences in the weighting system yielded different volume indices, and in these cases both are given in Table I.

Several points emerge immediately. First, Canadian physical production (whether measured gross or net) exceeds Australian in almost all the industries listed; Australian production is greater in total only in one industry (Bread, etc.). Second, Canadian physical *per capita* production also generally exceeds the Australian level, there being only one industry (again, Bread, etc.) in which Australian productivity appears to be significantly greater. The relative Canadian productivity advantage, however, varies very considerably from one industry to another. Finally, the difference between the gross and net volume indices for the same industries are fairly substantial in some cases, but not in others. Since gross volume figures are not shown for those industries having a considerable amount of duplicated sales, it may well be that discrepancies between the gross and net indices for the remaining industries reflect (at least to some extent) differences in the degree of fabrication of materials in the two countries.

In the *Food and Drink* group, Canada has apparently a clear lead in labour productivity in three industries (Biscuits, Flour-milling and Soft Drinks), Australia in one (Bread, Cakes, etc.), while in two others (Butter, Cheese, etc., and Beer) the results indicate that productivity was probably not greatly different in the two countries.

In the *Textile and Clothing* group, Canadian productivity was about 50 per cent above the corresponding Australian level for both cotton and wool textiles; this does not, of course, rule out the possibility of higher relative Australian productivity in *particular* textile processes. Canadian productivity was roughly double Australian in hosiery and corsets (net basis), and was about two and a half times the Australian level in the production of synthetic woven fabrics. Production of synthetic fabrics is on a very much bigger scale in Canada, the average plant is nearly three times as large and much longer "runs" are obtainable. In all three last-named industries, the degree of fabrication of materials appears to be relatively greater in Canada.

Only a very limited sample of industries is available in the *Chemicals* group. On a modified net basis, Canadian productivity varied in these from about one-half higher than in Australia to about four times as high. The general impression from the results for the three *Metals* industries is that productivity in Australia is possibly slightly higher than in Canada in steel-making, but that in the later stages of metal fabrication Canada has a substantial productivity advantage.

Of the four *Miscellaneous* trades included in Table I, Canada's productivity advantage was found to be about 50 per cent in three; in the fourth (cement), Canadian productivity was almost three times the Australian level.

4. *Mechanization and Productivity*

These differences in relative labour productivity may be due, to a large extent, to associated differences in capital used per head in Canadian and Australian industry. No data are, however, available for either country on the value of physical assets installed, or in use, in manufacturing industry on a replacement cost basis. The Censuses of both countries give figures of book values of capital assets employed, but the use of these figures might lead to misleading results in view of the well-known difficulties in their interpretation.[14]

An alternative approach is to use the data on the motive power of engines ordinarily in use, which are also collected and published in the Canadian and Australian Censuses. The rated horse-power of engines ordinarily in use per employee can be taken as a measure of the *degree of mechanization* of a particular industry. This does not necessarily reflect the degree of "capital intensity", on any reasonable definition of the latter. For one thing, the relation between the motive-power and the efficiency of a capital asset cannot be expected to be constant.[15] In addition, many capital assets have no motive-power (e.g. buildings, many specific types of plant, concrete structures other than buildings, permanent way, and so on) while the official figures exclude mobile power units, such as trucks, which may in fact be of considerable importance in overall productivity. The degree of mechanization is thus a rather different aspect of the capital-labour relationship than the degree of capital intensity, and probably—though there is no statistical evidence available—is less closely related to differences in output per head than is the more comprehensive concept of capital intensity.

If we consider labour and inanimate power as factors of production, we can relate the production indices for Canada to the relative size of the labour force in the two countries and to the relative horse-power in use. Table II shows the *per capita* power ratios for each industry, the ratio of employment and the ratio of total horse-power in use.

The relationship between relative output on the one hand, and relative employment and power on the other, can most conveniently be expressed in terms of a Cobb-Douglas type formula

$$\left(\frac{Qc}{Qa}\right) = a\left(\frac{Lc}{La}\right)^{\alpha}\left(\frac{Pc}{Pa}\right)^{\beta} \quad \ldots\ldots\ldots\ldots\ldots \quad (12)$$

where Q is the volume of production, L the number of persons employed and P the total power utilized, the subscripts representing the two countries being compared. In this formula, the parameter a measures the variation in the relative volume of production which is not explained by variations in the employment-ratio and the power-ratio;

14. The principal difficulty is that book values are highly dependent on the date of installation. They do not, therefore, reflect the *quantum* of assets installed at any one time.

15. This is partly because the technical efficiency of motive plant can be changed, either by alterations to existing plant, or by the replacement of more efficient for less efficient types of power (e.g. electric motors for steam boilers).

TABLE II

Relative Mechanization in Canadian and Australian Industries

Industry	Motive Power per Head[1]			Employment ratio	Total Power Ratio
	Canada[2]	Australia	*Per capita* Power ratio		
	(H.P.)		(Australia = 100)		
Food and Drink					
1. Flour-milling	12·50	7·94	158	101	160
2. Bread, Cakes, etc.	1·32	1·14	116	112[3]	130
3. Biscuits	1·65	1·57	105	122	128
4. Butter, Cheese, etc.	4·57	6·93	66	150[3]	99
5. Soft Drinks	1·44	2·11	68	153	104
6. Beer	4·14	5·21	80	150	120
Textiles and Clothing					
7. Cotton textiles	4·22	3·41	124	308	382
8. Wool textiles	3·46	2·84	122	71	87
9. Synthetic woven fabrics	3·54[4]	2·18	162	478	775
10. Hosiery	1·11[5]	0·76[5]	146	138	201
11. Corsets, etc.	0·31	0·45	69	106	73
Chemicals and allied trades					
12. Soap[6]	3·75	2·13	176	106	186
13. Paints, Varnish, etc.	2·95	3·99	74	136	101
14. Fertilizers	24·00	9·04	265	81	215
Metals and Metal Goods					
15. Iron and Steel	14·00	16·14	87	217	189
16. Wire-drawing	3·80[7]	3·82[7]	99	87	86
17. Heating and Cooking Apparatus	2·10	2·19	96	182	175
Miscellaneous					
18. Cement	48·90	24·72	198	78	154
19. Leather Footwear	0·58	0·72	81	94	76
20. Brushes and Brooms	1·28	1·26	102	119	121
21. Tobacco	0·76	1·20	63	169	106

(1) Rated horse-power of engines ordinarily in use (excluding electric motors run by power generated in the same establishment).
(2) Estimated from Census figures for 1948 and 1953.
(3) After excluding estimated numbers engaged in deliveries to customers in Canada. For the Bread, Cakes, etc., trade, this estimate is based on a return by firms employing three-quarters of the total in the trade. No comparable return was made for the Butter, Cheese, etc., trade, the number of outside delivery staff in this trade being estimated on the basis of their payroll (unpublished figure kindly notified by the Dominion Statistician, Ottawa), and average earnings of similar staff in the Bread, Cakes, etc., trade.
(4) Including synthetic yarn.
(5) Including underwear.
(6) Including synthetic detergents.
(7) Including wire fabrication.

the coefficients α and β indicate, respectively, the elasticity of the volume ratio with respect to variations in (Lc/La) with (Pc/Pa) constant, and with respect to variations in (Pc/Pa) with (Lc/La) constant.

A multiple logarithmic regression for the 21 industries in the above tables provides the following results:

$$\left(\frac{Qc}{Qa}\right) = 1{\cdot}41\left(\frac{Lc}{La}\right)^{0{\cdot}51}\left(\frac{Pc}{Pa}\right)^{0{\cdot}50}$$

The equation provides a moderately good explanation of variations in industrial production in Canada in relation to Australia, but about one-third of the total variation is left unexplained ($R^2 = 0{\cdot}656$). This is, perhaps, not surprising since there are bound to be important factors not considered here, such as differences in labour skill and effort, managerial and technical ability, length of "run" in the production process, and many others. Moreover, as already indicated, horse-power is not a good measure of capital assets employed.[16]

Standard errors of α and β are $\sigma\alpha = \pm\ 0{\cdot}25$ and $\sigma\beta = \pm\ 0{\cdot}20$, so that the significance of the value of α in the regression equation is doubtful. Nevertheless, it is interesting to note that the sum of the coefficients σ and β is not significantly different from unity. If therefore, we assume that $\alpha = 1 - \beta$, we can re-write (12) as follows:

$$\left(\frac{Qc/Lc}{Qa/La}\right) = a\left(\frac{Pc/Lc}{Pa/La}\right)^{\beta} \quad \ldots\ldots\ldots\ldots\ldots \quad (13)$$

The co-efficient remains at 0·50, as in (12). This means that, *ceteris paribus,* a 10 per cent advantage in power per head in Canada, compared with Australia, will tend to be associated with a 5 per cent advantage in Canadian physical output per head. Too much should not, however, be read into these results, partly for statistical reasons (i.e. the relatively large standard errors involved), but partly also because the economic meaning of a Cobb-Douglas function is not too clear when the comparison is between countries whose industrial production differs as to product-mix and between which there is only a limited mobility of factors of production, and limited inter-change of industrial products.

5. *Relative Labour Productivity in Manufacturing as a Whole*

The diversity of experience, as regards relative labour productivity, from one industry to another makes it difficult to arrive at a valid comparison for Canadian and Australian manufacturing taken as a whole.

A direct way of generalizing would be to take the figures of relative labour productivity in the selected industries examined above (see Table I), and to average them using either weighted or unweighted means. This procedure might, however, lead to very misleading results, since it would necessarily assume that relative productivity in the industries omitted was the same as the mean relationship in those included in the calculation. As the selection of the latter was deter-

16. Since this section was drafted, an analysis on similar lines has been published by J. B. Heath comparing British and Canadian industries, *op. cit.* Mr. Heath's equation fitted his data more closely (his $R^2 = 0{\cdot}9705$) than the comparable equation here.

mined very largely by the adequacy and comparability of the national Census statistics, they cannot be assumed to be a representative selection in this respect. The assumption of equal relative productivity cannot therefore be maintained. It would be particularly dangerous in the important metals and engineering group, as well as in the miscellaneous group of industries, where the industries listed in Table I cover one-tenth or less of total value added (see Table III).

TABLE III

Relative Importance of Sample Industries

Industry Group	Value added in sample industries		Total Value added		Sample as proportion total	
	Canada	Australia	Canada	Australia	Canada	Australia
	($ mill.)	(£ mill.)	($ mill.)	(£ mill.)	(Per cent.)	
Food & Drink ..	412·1	48·1	885·3	113·4	46·5	42·4
Textiles & Clothing ..	252·9	35·6	668·5	109·3	37·9	32·5
Chemicals etc. ..	87·5	13·3	317·2	52·7	27·6	25·2
Metals & Metal Goods	214·0	23·6	1,995·9	328·0	10·7	7·2
Miscellaneous ..	137·9	21·4	2,075·2	221·3	6·6	9·7
Total	1,104·4	142·0	5,942·1	824·7	18·6	17·2

The alternative assumption is that the appropriate exchange rate for industries excluded from Table I is the same as for those included. This is a more plausible assumption since it is likely that relative costs and prices in different countries are subject to many common influences industrywise. This is the assumption used in formula (11) above.[17]

The implied rates of exchange (e_i and e_j, in the notation used earlier), for the sample of 21 industries are shown in Table IV.[18] Wherever possible, separate rates are given on Canadian and on Australian weighting. Where a single rate is given, this means that there is one dominant commodity in the trade so that the two rates are automatically identical.

Several conclusions can be drawn from the implied exchange rates in Table IV. The first is that the official rate of exchange ($Can. 2·24

17. This corresponds to the assumption, when comparing outputs at different periods in the same country, that the price change for omitted items is the same as for those included.

18. For flour-milling and hosiery, the implied exchange rates for final output (e) and for materials used (η) can be directly compared. These are:

	e ($)	η ($)
Flour-milling	5·12	5·14
Hosiery	2·29–2·41	2·17–2·63

For flour-milling, the calculation of η is based on over 90% of the total materials cost in each country; for hosiery, on rather more than 75%. For none of the other selected industries could a calculation of η be based on more than half the total materials cost in both countries. For Brewing, e was $5·42–5·82 whereas η was only $3·33; in this case η was based on hops and malt, accounting for 43% of the total cost of materials in Australia and 58% of the comparable Canadian total.

TABLE IV

Implicit Gross Exchange Rates[1] for Selected Industries

$ Can. per £A.

Industry	Weighting	
	Canadian	Australian
Food and Drink		
1. Flour-milling	5·00[2]	
2. Bread, Cakes, etc.	5·10	
3. Biscuits	5·10	
4. Butter, Cheese, etc.	4·40	4·35
5. Soft Drinks	5·14	
6. Beer[3]	8·48[2]	7·88[2]
Mean (excluding Beer)	*4·89*	*4·89*
Textiles and Clothing		
7. Cotton textiles	2·69	
8. Wool textiles	3·26	
9. Synthetic woven fabrics	2·00	1·91
10. Hosiery	2·14[2]	2·36[2]
11. Corsets, etc.	2·10	2·20
Mean	*2·58*	*2·86*
Chemicals and allied trades		
12. Soap	4·04	4·26
13. Paints, Varnish, etc.	2·45	2·43
14. Fertilizers	2·55	2·18
Mean	*2·95*	*2·94*
Metals and Metal Goods		
15. Iron and Steel[4]	4·68	4·88
16. Wire-drawing	3·51	3·83
17. Heating and Cooking Apparatus	4·00	3·42
Mean	*4·06*	*4·04*
Miscellaneous		
18. Cement	4·14	
19. Leather Footwear	2·53	2·63
20. Brushes and Brooms	2·50	2·99
21. Tobacco	2·29	2·19
Mean	*2·69*	*2·73*

(1) Based on formulae (5) and (6).
(2) Net exchange rates, using formulae (7) and (8).
(3) The high net exchange rates for Beer probably reflect the very different capital-structure of the industry in the two countries as a result of the concentration on bottling and canning in Canada but not in Australia. For this reason, Beer is excluded from the calculation of the mean rate for the Food and Drink group.
(4) Based on rolled products (other than semis) only.

= £A.1) is generally inappropriate for reliable comparisons of Australian and Canadian manufacturing production. Indeed, of the 35 rates listed, only seven are below the official rate, whereas ten are more than double the official rate. The conversion of national currencies by the use of the official rate would thus generally result in a comparison of industrial production and productivity very considerably less favourable to Australia than the facts would warrant. The Canadian dollar is thus "over-valued" when one compares the relative price levels of industrial output. This is not surprising, since the actual exchange rate depends on an agglomeration of forces, both internal and external, acting on the balances of payments of the two countries. A major factor in the strength of the Canadian dollar since the end of the war has been the substantial inflow of capital, very largely from the United States.

Secondly, it is apparent that differences in the rates due to differences in commodity-structure are relatively small. Apart from the several trades for which separate rates on country weightings could not be distinguished, the majority of trades for which both rates are given showed differences of 5 per cent or less between the two. Only for fertilisers, heating and cooking apparatus and brushes and brooms, did the difference between the rates on the two weightings significantly exceed 10 per cent.

Finally, the differences *within* industry groups are generally much smaller than those *between* groups. To a large extent, these differences probably reflect relative efficiencies in production in the various industry groups. It therefore seems reasonable to estimate an average exchange rate for each industry group on the basis of the rates for the individual industries in the sample; the average rates (weighting the individual rates by the value added in each industry in Canada and in Australia) are shown in italics in Table IV. No attempt has been made to compute standard errors in view of the small number of trades in each group, but it should not be forgotten that the procedure adopted necessarily involves some margin of error in the results. The margin of error can be taken as highest in the Metals and Metal Goods and Miscellaneous groups, for which the sample coverage is smallest.

There is, in fact, no way of arriving at the "true" exchange rate for the important machinery group on the basis of the published Census data alone; a much more intensive survey of comparable products would be necessary. From many points of view it is unsatisfactory to base conclusions about relative productivity in the machinery field on a sample of three industries, none of which properly falls within this field even though all are closely allied to it. The mean rate shown in Table IV for the Metals and Metal Goods group is relatively high compared with that for other groups, and it may well be the case, therefore, that the "true" rate for this group is lower than is indicated by the sample. If so, Canada's productivity advantage in this group is greater than is indicated by the index numbers given below.

A general comparison of relative labour productivity in the two

countries can now be made. For each of the five industry groups, Table V shows employment, value added and value added per head, both at Canadian and at Australian prices, using the average exchange rates shown in Table IV.

TABLE V

Value Added at Canadian and Australian Prices

Industry Group	Employment	Value Added		Value Added per Head	
		Canadian prices[1]	Australian prices[2]	Canadian prices	Australian prices
	(1000)	($ mill.)	(£A mill.)	($)	(£A)
		CANADA (1950)			
Food & Drink[3]	167·7	885·3	152	5,620	1,085
	(150)	(841)	(163)		
Textiles & Clothing[4]	196·5	668·5	234	3,410	1,190
Chemicals, etc.	41·5	317·2	108	7,640	2,600
Metals and Metal Goods	373·7	1,995·9	494	5,345	1,320
Miscellaneous[5]	403·9	2,075·2	760	5,140	1,880
Total	1,183·3	5,942·1	1,748	5,020	1,475
	(1,164)	(5,898)	(1,759)	(5,060)	(1,510)
		AUSTRALIA (1950/51)			
Food & Drink	119·4	580	113·4	4,850	950
Textiles & Clothing[4]	163·0	282	109·3	1,730	672
Chemicals, etc.	36·3	155	52·7	4,270	1,455
Metals & Metal Goods	373·8	1,330	328·0	3,560	877
Miscellaneous[5]	262·7	595	221·3	2,265	840
Total	955·2	2,941	824·7	3,080	863

(1) Using the Canadian-weighted mean exchange rates shown in Table IV to convert the Australian figures.
(2) Using the Australian-weighted mean exchange rates shown in Table IV to convert the Canadian figures.
(3) The figures in brackets are estimated totals exclusive of delivery staff. The figures for value added per head are based on these estimated totals. In the calculation, value added in the Brewing industry in each country was "converted" into the other's currency by use of the net exchange rates for Beer shown in Table IV; the remainder of the Food and Drink group was "converted" at the mean rate (excluding Beer) shown in Table IV.
(4) Excluding footwear.
(5) Including footwear and tobacco.

There are some striking similarities revealed by Table V, as well as some important differences.

The relative sizes of the main industry groups in each country are substantially similar, whether measured in terms of employment or of value added. In each country, the Food and Drink industries employ about one in eight of the total manufacturing labour force, the Textiles and Clothing industries one in six and Chemicals less than one in twenty. The main difference in industrial structure is in the relative magnitudes of the Metals and Metal Goods industries (two-fifths of total employment in Australia, one-third in Canada), and the Miscel-

laneous group, which is relatively larger in Canada (over one-third as against little more than one-quarter in Australia).

The industrial pattern of the output per head figures is also generally similar. In both countries, value added per head in national currency is highest in the Chemicals industries, though the discrepancy is greater in Australia (where the figure is two-thirds above the overall average), than in Canada (one-half above). Similarly, the Textile and Clothing group is well below the average in value added per head (one-third lower in Canada and one-fifth lower in Australia).

The outstanding difference between the two economies is in the relative level of value added per head. This can more easily be seen from the index numbers shown in Table VI, based on the absolute figures given in Table V. These index numbers are of the form described in formula (11) above.

TABLE VI

Employment, Production and Productivity Indices for Canada

(Australia = 100)

Industry Group	Employment	Production[1]		Production per head[1]	
		At Canadian prices	At Australian prices	At Canadian prices	At Australian prices
Food and Drink	126[2]	145	145	115	115
Textiles and Clothing ..	120	235	215	195	180
Chemicals, etc.	114	205	205	180	180
Metals and Metal Goods ..	100	150	150	150	150
Miscellaneous	154	350	345	225	225
Total	122[2]	200	215	165	175
Total Non-Food	121	215	225	180	185

(1) Modified net volume indices (see formula (11)). All figures have been rounded to nearest 5.

(2) Based on estimated employment in Canada exclusive of outside delivery staff. (Had these not been excluded, the indices would have been 140 for Food and Drink and 124 for the total).

The results confirm our tentative conclusions based on the sample of 21 industries. The Canadian productivity advantage appears to have been very substantial indeed in Textiles and Clothing and in Chemicals; allowing for the inevitable margin of error, it might be reasonable to put the magnitude of the Canadian productivity advantage in these industries at probably not less than 75 per cent and possibly as rather more than 100 per cent.

In the Metals and Metal Goods industries, Canadian labour productivity is clearly higher and—as already mentioned—may well be understated by the indices in Table VI. It would also seem to be the case that the Canadian advantage is essentially in the fabrication stages and not in steel manufacture. Australia most nearly approaches Canadian productivity levels in the Food and Drink trades; this group includes several individual processes (including bread baking) in which

Australian productivity appears to exceed Canadian. The relatively high Canadian productivity index for the Miscellaneous group of trades is to some extent artificial, in so far as the product-mix differs in the two countries.

Taken as a whole, the results for the five industry groups show a marked positive association between the relative volume of production and relative physical production per head.

A productivity comparison for manufacture as a whole can again be made on the basis of the weighting of either country. The results, given at the bottom of Table VI, are thus generally in the form of a range of index numbers. On the basis of Canadian prices, the total volume of manufacturing production in Canada was about double that in Australia, whereas on the basis of Australian prices the difference was rather greater. There is also a difference in the indices for production per head on the basis of the prices of the two countries.

The differences in the two sets of index numbers arise not merely from differences in weighting (i.e. in the relative totals of value added in the different industry groups in the two countries), but also from differences in the form of the index used. The index of 200 (based on Canadian weights) for total manufacturing production is an harmonic mean of the volume indices for the industry groups, whereas the index of 215 (based on Australian weights) is the corresponding arithmetic mean. Adding the harmonic mean on Australian weights and the arithmetic on Canadian weights, we have the following results:

Volume of Production in Canada

(Australia = 100)

	Harmonic mean	*Arithmetic mean*
Canadian weights	200	230
Australian weights	190	215
Canadian advantage on Canadian weights	*5%*	*7%*

It would seem, therefore, that Australia has a modest advantage (between 5 and 10%) arising from her *relative* specialization in goods in which she has a *relative* productivity advantage compared with Canada. If Australia were to switch overnight to the same industry-structure that existed in Canada, then, *ceteris paribus*, her relative labour productivity would fall by the same percentage.

The discrepancy appears to originate largely in the Miscellaneous group of industries, for which Canadian productivity is relatively highest and which are, at the same time, relatively more important in Canada in terms of size. Leaving this group out of the calculation entirely, the difference in overall productivity on the two weighting systems virtually disappears. The Australian *relative* concentration on metals and metal goods is, however, also of some importance here, since in this industry group Australian relative productivity is higher than the average level.

In the non-food sector, the Canadian relative productivity advantage—eliminating differences in the form of the volume indices—amounts to 7 to 9 per cent overall. This is only marginally greater than for manufactures as a whole

No significant part of the productivity difference can be attributed to differences in the length of the working week. In Canadian manufacturing industry average hours worked in 1950 were 43·5 for wage-earners and 39·7 for salaried employees; using relative numbers of wage- and salary-earners as weights, the Canadian average was 42·7 hours. No comparable figures of actual hours worked are available for Australia, the official statistics for that country relating to "standard" hours of work, no allowance being made for overtime or short-time. The average "standard" in Australian manufacturing industry in 1950/51 was a 40-hour week, but in the post-war period of general labour scarcity, average actual working hours almost certainly exceeded 40 and were probably not significantly different from the Canadian level.

Comparisons of physical productivity in themselves do not, of course, tell us very much about relative *costs* per unit of output. Some light on the cost aspect can, however, be thrown by an examination of relative wages and gross margins.[19] At the official rate of exchange[20] average earnings per employed person engaged in manufacture in Canada (1950) were double those in Australia (1950/51), while the average gross margin per head was more than three times the Australian figure. These ratios were, in fact, due essentially to the considerably higher cost level in Canada (at the official exchange rate), and not to differences in industry-structure, compared with Australia. The greater difference in gross margins than in average earnings reflects in part the higher capital-intensity of production, and probably also a higher level of selling costs, including advertising. It also seems probable—though the point cannot be substantiated from gross margin figures alone—that the relative profitability of manufacture in Canada, compared with Australia, is greater than the relative level of wages.

Thus, the Canadian advantage in terms of physical productivity was more than offset by her relatively higher wage and salary costs and gross margin. In terms of per unit output, wage and salary costs in Canada were 15 to 25 per cent higher than in Australia (according to the method of weighting used), while the gross margin was about double. The relevant index numbers for total manufacturing industry in Canada (Australia = 100) at the official rate of exchange are as follows:

Per employee	
Wages and salaries	205
Gross margin	330

19. "Wages" here are taken to include salaries, while "gross margin" is taken to be the difference between value added in production and wages and salaries.

20. For a comparison of *costs,* as distinct from physical productivity, the relevant exchange rate is the one actually used in international transactions.

Per unit of output

Wages and salaries	115–125
Gross margin	190–200

Having established, approximately, the relative level of Canadian and Australian productivity in 1950 (or 1950/51), it is possible to extend the comparison in both directions through time, by the use of appropriate index numbers of the volume of manufacturing production per head in the two countries. This is done in Table VII, which shows the relevant indices for four periods in comparison with 1950.[21] The relative hourly productivity series must, however, be taken as only a rough approximation since, as already mentioned, the Australian statistics relate to "standard" hours and not to hours actually worked. The relative productivity per hour index for Canada in 1950 (or 1950/51) is taken as 165-175 (as in Table VI), while the indices for other periods are derived by multiplying the 1950 indices by the ratio of the relevant production per employee-hour indices.

TABLE VII

Relative Trends in Labour Productivity in Manufacturing Industry

Series/country	1911–13	1927–30	1936–39	1950 or 1950/51	1953–55
	(1950 or 1950/51 = 100)				
Production per employee-year					
Canada	50	75	83	100	105
Australia	68	85	96	100	114
Production per employee-hour					
Canada	40	64	77	100	108
Australia[1]	56	75	86	100	114
	(Australia = 100)				
Canada[2]	120–125	140–150	145–155	165–175	155–165

(1) Based on movement in average "standard" hours of work (see text).
(2) Indices rounded to nearest 5.

Between 1911-13 and the late 'twenties, annual physical production per head in Canada rose more sharply than in Australia. From the late 'twenties to the late 'thirties, the average annual rate of increase in output per head was similar in the two countries, but between the late 'thirties and the early 'fifties Canada drew ahead once more.

Though the figures of hourly productivity must be interpreted with greater caution, it would seem that probably the relative trends in output per employee-hour were much the same as in output per employee-year. In absolute terms, the indices suggest that even before the first World War labour productivity was greater in Canada than in Australia (possibly by one-quarter or one-fifth). A further gap was then opened and by the late 'twenties Canada was enjoying a margin

21. Canadian series based on *Census of Manufactures* Reports, supplemented by Colin Clark, *op. cit.*; Australian series from A. Maizels, *op. cit.*

of advantage of some 40–50 per cent (according to whether Australian or Canadian weighting is adopted). The Canadian relative advantage continued to grow in the 'thirties, and there has, if anything been a still further widening of the gap since then. As these results are based on the relative movements of overall production indices for the two countries, part of the trend shown in Canada's productivity margin may be due to differential shifts in her industrial structure, relative to Australia's, as well as to increasing relative productivity within each industry group.

6. *Conclusions*

The present enquiry has shown that, broadly speaking, labour productivity is at present (1953/55) probably in the region of one-half to two-thirds higher, on an hourly basis, in Canada than in Australia; and that a major factor in this difference is the greater use of mechanical and electrical power per head in Canada. From an examination of available time series, it seems that the Canadian relative productivity advantage has been increasing since before the first World War, at which time physical output per employee-hour was probably moderately in Canada's favour. On a cost basis, however, Canada's present advantage in physical terms is more than offset by her higher wage and gross margin costs measured at the official rate of exchange.

These results must clearly be interpreted with some caution in view of the many difficulties of international comparisons of this sort. The margin of error in the figures may indeed be considerable, and it would be unwise to expect the method used here to produce more than reasonable orders of magnitude from the imperfect statistics available. Probably the results for individual industry-groups contain a greater margin of error than those for manufacturing industry as a whole. More precise productivity comparisons could be made on the basis of field studies of comparable factories in the two countries, but this type of study falls outside the scope of the present article.

Moreover, the use of the concept of "modified net volume" is not to be preferred to the usual net volume calculation; its adoption here is justified purely in terms of arriving at a reasonably close estimate of the relative *quantum* of productive work done, comparing one country with another, given the limitations of the available statistical data. It is to be hoped that as national Census publications improve in their methods of statistical presentation and in their detail of output and materials, it will be possible to make international comparisons on a wider scale using genuine net volume indices.

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NOTES

INVESTMENT IN WESTERN AUSTRALIA, 1948/49 TO 1952/53

Introduction

The fundamental importance of the role of investment in maintaining and raising productivity and thus in contributing to the rise in standards of living is everywhere acknowledged. Only the discovery and exploitation of new techniques and the growth of population rival capital formation as the mainsprings of economic progress and these two factors are closely related to investment anyhow. Plans for economic development can be formulated accurately only if information is available on total resources and the proportion of them devoted to the various aspects of capital formation.

Investment is subject to large variations from year to year, more than the other factors, because of the relative postponability of most types of capital expenditure, the volatile nature of the factors affecting profit expectations and therefore private investment, and the political influences on public investment. Movements in capital expenditure are closely linked to those in economic activity generally and for this reason alone the examination of these movements is important.

We are concerned here with the "physical" (or quantitative) approach to the measurement of gross capital formation—all additions to the goods to be used in future productive processes; machinery, buildings, working stocks, etc. Although future production is also facilitated by expenditure on research and on health and education, particularly technical education, data on such expenditures have not been included because of the difficulties of valuation. Purchases of durable goods by households, with the exception of dwellings and motor vehicles are excluded for practical reasons rather than on strictly logical grounds. Net changes in investment outside the State by residents of Western Australia are also excluded since our concept of capital formation is designed to measure changes in the productive capacity of the State's economy.

Capital formation may be measured at any stage in the process—the accumulation of funds, the actual production of capital goods or the expenditure of funds; the latter approach will be used here. Measured in this way capital formation is related to the productive capacity of enterprises and government departments and instrumentalities. Stock changes are recorded as the changes in the value of farm stocks and of the stocks of marketing authorities—mainly the Australian Wheat Board and the Wool Realization Committee. Strategic stockpiling is excluded and non-farm stock changes are recorded at book value. It would be preferable to show all stock changes at the value of the physical change because book values are affected by price changes over the accounting periods and do not reflect the prices of materials

used in the original production processes. However, the changes in the book value of non-farm stocks are the only figures readily available.

Conceptually, expenditure on physical assets having an economic life longer than the accounting period should be classed as capital formation. In practice, accounting procedure departs from this criterion by excluding from capital account most low cost items and those with a constant replacement rate. This, however, should not lead to large errors.

In a note such as this it is not possible to detail the methods used in determining the expenditures, though they are described fully elsewhere.* The source for most of the basic data and for the various indicators used for allocation was the Commonwealth Bureau of Census and Statistics. Expenditure on farm machinery was estimated by an independent survey and some of the figures for expenditure by Commonwealth Government Departments in Western Australia on buildings and equipment were obtained from the departments concerned.

Private Investment

Gross private investment is shown in Table I.

TABLE I

Gross Private Investment in Western Australia

(£ million)

	1948/49	1949/50	1950/51	1951/52	1952/53
Private Dwelling Construction ..	3·0	3·7	7·3	10·5	14·1
Other Building	1·8	2·2	2·8	4·2	4·4
Trucks and Utilities	2·4	4·1	6·3	6·5	5·5
Cars and Cycles	3·9	7·6	8·3	11·3	8·9
Other Capital Equipment—					
Rural	1·8	3·0	4·7	6·2	5·1
Non-Rural	6·0	7·3	10·3	15·9	14·5
Fixed Capital Equipment	18·9	27·9	39·7	54·6	52·5
Non-Farm Stocks	3·8	4·7	9·4	15·2	–7·5
Farm Stocks	–1·9	3·0	–1·3	—	2·7
Gross Private Investment	20·8	35·6	47·8	69·8	47·7

Discussing the components in detail it can be seen that there was a rapid expansion in dwelling construction over the period under review. This was due to the banked-up demand caused by the sharp drop in private dwelling construction during the 1939/45 war and was accentuated by the immigration programme of the post-war period. Strenuous efforts were made to increase the supplies of labour—via the C.R.T.S.—and of building materials. In the last-mentioned case both private industry and State instrumentalities played their part. Private construction other than dwellings did not expand with the same rapidity, probably due to governmental recognition of the greater social need for dwellings, and to attractive investment opportunities in other

* Faculty of Economics (Mimeographed Report): *Income and Investment Trends in Western Australia* (University of Western Australia, 1957).

States which, particularly in the case of Australia-wide companies, were not counterbalanced in Western Australia until the great surge of activity which followed the 1953 and 1954 boom years.

Rising prices, increasing population and continuing prosperity between 1948 and 1953 were reflected in the expenditures on motor vehicles. The figure for commercial vehicles remained a fairly constant proportion of the total until 1950/51 when it rose. Most of the increase came from the non-rural sector and may have had its origin in the generally prosperous conditions in that year. Investment in both types of vehicle was affected uniformly by the slight recession at the end of 1952 and the drop was also accentuated by import restrictions.

So far as investment in other capital equipment by the non-farm sector was concerned there was a distinct increase in expenditure over the first four years of the period. This was undoubtedly connected with the high rate of increase in population.

The figures for investment in other capital equipment by the farm sector also rose steadily and showed the general prosperity of the rural industries. Although the drop in the prices of farm products occurred in 1951/52, deliveries of equipment, etc., continued and the impact of the consequent fall in farm incomes on investment was not felt until 1952/53.

The wide variations in the figures for changes in farm stocks were the result of the many factors associated with the marketing of primary produce plus the influence of industrial unrest in the transport industries which led to strikes, and the carrying over of stocks. Upward and downward variations in the changes in the book values of non-farm stocks were not as evident as in the case of farm stocks. Increases were relatively greater as they incorporated the results of inflationary pressures. The increases rose rapidly in 1950/52 when imports were high and prices were rising rapidly, then fell sharply in 1952/53 when import cuts were imposed.

We may conclude this section with some remarks on the "credit squeeze" of 1952/53 which followed the sharp decline in overseas reserves which occurred in the previous year. It affected all categories of private capital expenditure adversely except in the building industry. Apparently the pressure of the housing lag, and the role played by the State Housing Commission were sufficient to outweigh the general restriction of credit which in any case pressed more heavily on the business sector than on persons wishing to build new houses. The net result, however, as can be seen from Table I, was a decline in the figures for fixed capital equipment and for gross private investment.

Public Authority Investment

Government expenditure on capital formation includes that on buildings, other construction and works, and machinery and equipment. Roads, canals, harbours, other transport facilities and navigational aids are included under other construction and works. Also included is expenditure on conservation, drainage, reclamation, flood control,

re-afforestation and similar projects. All military expenditure except permanent housing is excluded.

A classification of government expenditure such as this obviously involves problems of distinguishing between investment as defined above and expenditure on repairs and maintenance which are recurrent. The Commonwealth Statistician's definition of public works expenditure corresponds closely to the one given above for public authority capital formation. These figures have the merit that they are the official ones used in the national income estimates and hence some degree of comparability between Western Australia and the Commonwealth as a whole can be assumed. The figures are shown in Table II. From this it can be seen that direct expenditure by the State Government has increased about twice as much as that by semi-governmental and local government authorities and the Commonwealth Government.

TABLE II

Gross Public Investment in Western Australia

	1948/49	1949/50	1950/51	1951/52	1952/53
	£m	£m	£m	£m	£m
Western Australia—					
State Government ..	4·7	8·1	11·8	16·9	21·3
Semi-Governmental ..	3·1	4·1	4·8	6·3	6·2
Local Government ..	1·3	1·7	2·0	2·5	2·6
Total, W.A. Governments ..	9·1	13·9	18·6	25·7	30·1
Commonwealth Government	1·4	1·5	2·4	3·0	2·8
Gross Public Investment—	10·5	15·4	21·0	28·7	30·1

Some Comparisons

In this section some examination will be made of the relationships between the components of gross capital formation. These components will also be related to income, and comparison made between the Western Australian and Commonwealth figures.

Fixed capital equipment accounted for a greater proportion of gross private capital formation in Western Australia than in the Commonwealth as a whole in each year except 1952/53. This was due to the relatively greater importance of the changes in non-farm stocks in the Commonwealth figures. Our discussion will be confined to the percentage distribution of the components of expenditure on fixed capital equipment in Western Australia and the Commonwealth. This is shown in Table III (page 94).

From this table it can be seen that the relative importance of private dwelling construction in Western Australia was less than in the Commonwealth for most of the period. The State percentages, however, rose after 1949/50 while the Commonwealth figures remained steady, finally being overtaken by the Western Australian percentages in 1952/53. The main reason for this was probably the relatively slow

TABLE III

Private Expenditure on Fixed Capital Equipment W.A. and Australia

(Percentage Distribution)

	1948/49		1949/50		1950/51		1951/52		1952/53	
	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %
Private Dwellings ..	15·9	22·4	13·3	21·0	18·4	22·2	19·2	22·8	26·9	24·7
Other Building ..	9·5	11·3	7·9	9·9	7·1	9·4	7·7	11·2	8·4	12·5
Trucks and Utilities	12·7	9·3	14·7	11·5	15·9	12·6	11·9	11·3	10·5	8·9
Cars and Cycles ..	20·6	17·7	27·2	22·4	20·9	20·3	20·7	19·6	17·0	17·1
Other Capital Equipment ..	41·3	39·3	36·9	35·2	37·7	35·5	40·5	35·1	37·2	36·6
Fixed Capital Equipment ..	100	100	100	100	100	100	100	100	100	100

initial recovery of the State building industry and the impetus given to it after 1950 by the heavy migrant intake.

Expenditure on building other than dwellings was appreciably less important in Western Australia than in the Commonwealth, but as this is linked partly to manufacturing industry it is hardly surprising. Expenditure on trucks and utilities was relatively more important in Western Australia than in the Commonwealth as a whole. This may be due in part to the distribution of population and the relatively greater development in the tertiary field, and in part due to the war-time deterioration of the State railway system. Over the five years this discrepancy decreased, probably due to the progress made in rehabilitating the railways. Expenditure on cars and cycles showed a similar movement and the basic reasons are probably the same. The Western Australian percentages for other capital equipment differ very little from the Commonwealth percentages but are slightly higher throughout. In the non-farm sector the rise, relative to the Commonwealth, was spread over all secondary and tertiary industries with the exception of mining, which maintained its position. This general rise was apparent despite the fact that the method of allocation probably understates the Western Australian share as it does not fully allow for major capital investment projects employing a relatively small labour force such as the oil refinery at Kwinana. The more rapid rise in population in Western Australia relative to the Commonwealth, as we have noted above, would help to account for at least some of this industrial expansion.

In Table IV below, capital expenditures in Western Australia and the Commonwealth are related to income. In the case of the Commonwealth, net national income at factor cost is used as the base and for Western Australia the figures for community income at factor cost are employed.

As a percentage of income, expenditure on fixed capital equipment in both Western Australia and the Commonwealth rose over the first four of the five years then fell in 1952/53. The Western Australian

TABLE IV

Gross Capital Expenditure—Western Australia and the Commonwealth

(Percentage of Income at Factor Cost)

	1948/49		1949/50		1950/51		1951/52		1952/53	
	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %	W.A. %	Aust. %
Fixed Capital Equipment ..	15·8	15·4	18·6	18·5	19·7	18·4	25·2	22·3	21·4	18·0
Stock Changes ..	1·6	4·1	5·1	6·7	4·1	7·3	7·1	11·7	−1·9	−3·8
Gross Private Investment ..	17·4	19·5	23·7	25·2	23·8	25·7	32·3	34·0	19·5	14·2
Gross Public Investment ..	8·8	7·3	10·2	8·7	10·4	9·4	13·3	12·2	13·4	10·9
Gross Capital Expenditure ..	26·2	26·8	33·9	33·9	34·2	35·1	45·6	46·2	32·9	25·1

percentages were appreciably above those for the Commonwealth for the last three years, probably due to population growth and to large capital projects which were getting under way at this time. Fluctuations in stocks were also more pronounced in the case of the Commonwealth at the end of the period. They were sufficient to maintain private investment as a higher proportion of income in the Commonwealth than in Western Australia for the first four years, when the changes were positive. When the changes were negative, in 1952/53, the positions were reversed. The Commonwealth percentages for gross public investment were below those for Western Australia throughout the five years, the difference being particularly marked in 1952/53. Public works expenditure for the Commonwealth was substantially the same in this last year as it had been in the previous one, measured in money terms, and it therefore fell relatively to income. On the other hand, in Western Australia it rose by £4·2 million, maintaining its position relative to income; £2·6 million of this increase was on roads and railways. So far as gross investment is concerned there is little difference between the Commonwealth and Western Australian percentages over the first four years. In 1952/53, however, the Western Australian percentage was considerably higher than that for the Commonwealth.

The figures for gross investment per head and net income at factor cost per head were as follows:

TABLE V

Investment and Income—Western Australia and the Commonwealth

(£ per head)

	1948/49	1949/50	1950/51	1951/52	1952/53
Income—Western Australia ..	£234	£288	£369	£378	£414
Commonwealth ..	£254	£293	£385	£392	£420
Investment—W.A.	£62	£98	£126	£173	£136
Commonwealth ..	£68	£100	£135	£181	£105

Income per head was higher in the Commonwealth than in Western Australia and so was investment in each year except 1952/53. It is interesting to note that the difference in income per head is smallest in 1949/50 and 1952/53; the excess of Commonwealth investment per head is also at a minimum in those two years. The income-generating properties of gross investment may well be illustrated here.

We turn finally to the relationship between capital formation by the Commonwealth Government in Western Australia and that by the Western Australian Government. The figures for expenditure on capital goods by the Commonwealth Government as a percentage of gross public investment in Western Australia and in the Commonwealth as a whole are as follows:

	1948/49 %	1949/50 %	1950/51 %	1951/52 %	1952/53 %
Western Australia	13·3	9·7	11·4	10·5	8·5
Commonwealth	18·3	19·6	17·2	16·9	16·4

The figures for expenditure on capital goods by the Commonwealth Government in Western Australia and throughout the Commonwealth expressed in money terms per head per annum are also shown:

	1948/49	1949/50	1950/51	1951/52	1952/53
Western Australia	£2·7	£2·9	£4·4	£5·1	£4·6
Commonwealth	£3·4	£5·0	£6·2	£8·1	£7·5

These figures indicate that direct spending on capital goods in Western Australia by the Commonwealth Government is appreciably below the figure for Australia as a whole. However, no interpretation of these figures can be made without reference to the complex of federal-state financial relationships and in particular the process of making grants to States from Commonwealth funds for the purposes of capital formation.

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ARBITRATION IN PERSPECTIVE—A FURTHER COMMENT

In the April issue of this journal Professor Walker[1] gave an interesting and useful analysis of recent changes in federal arbitration law and also of the impact of compulsory arbitration upon industrial relations. The purpose of this note is to supplement Section 3 of his article which deals with Arbitration in Perspective with some additional material which may help to further our understanding of the achievements of this institution.

1. "Arbitration in a New Key", by K. F. Walker. *Economic Record*, Vol. XXXIII, No. 64, April 1957, pp. 60-72.

Settlement of Strikes

On page 67 Professor Walker states that the government tribunals have played a relatively minor role in the settlement of strikes (work stoppages)—only 10 per cent as against 53 per cent by direct negotiation between the parties over the thirty-nine years from 1913 to 1951. These figures merely refer however to the average experience over the period as a whole, and because of this conceal variations around this average which have occurred at different times during this period. For example, according to the data in Table I there has been a substantial shift since the last war in the importanceof the various methods of settling strikes, at least as regards industry as a whole.[2]

TABLE I

Methods of Settlement of Strikes (All Industries) 1913–1945 and 1946–1956

Year	Direct Negotiation (a)	Under Industrial Acts	Other Methods	Total	Direct Negotiation (a)	Under Industrial Acts	Other Methods	Total
	Numbers				Percentages			
1913–1945(b)	254	35	111	400	63·4	8·7	27·9	100·0
1946–1956(b)	326	172	761	1,259	25·9	13·6	60·5	100·0
1946	474	43	347	864	54·9	5·1	40·0	100·0
1947	355	139	488	982	36·2	14·2	49·6	100.0
1948	360	139	639	1,138	31·7	12·2	56·1	100·0
1949	296	104	448	848	34·9	12·3	52·8	100·0
1950	347	161	764	1,272	27·3	12·7	60·0	100·0
1951	271	223	846	1,340	20·4	16·0	63·6	100·0
1952	368	228	1,037	1,633	22·7	13·4	63·9	100·0
1953	287	206	963	1,456	19·7	14·1	66·2	100·0
1954	293	207	987	1,487	19·7	14·0	66·3	100·0
1955	286	238	1,003	1,527	18·7	15·6	65·7	100·0
1956	247	204	855	1,306	18·8	15·7	65·5	100·0

Source: Labour Reports and Special Returns of the C.B.C. & S.
(a) Includes Mediation.
(b) Annual Averages.

These figures show that the number of strikes settled by direct negotiation has fallen heavily while the numbers settled under the industrial acts (i.e. by arbitration) and by "other" methods (i.e. mainly by the strikers resuming work without attempting either to negotiate or to arbitrate) have risen sharply over this period. The relative changes are even more pronounced: the proportion settled by direct negotiation has declined from 63·4 per cent over the period 1913 to 1945 to only 25·9 per cent since then. By contrast, the proportion settled by "other methods" over the same periods has risen from 27·9 per cent to 60·5 per cent. By 1956 the figure for direct negotiation had fallen further back to 18·8 per cent whereas the figures for arbitration and these "other methods" has risen to 15·7 per cent and 65·5 per cent respectively. This sharp rise in the percentage of strikes which

2. For an account of variations in these methods during earlier years see my article on "Strikes in Australia" in the May 1953 issue of this Journal, pp. 84-85.

are settled mainly by the strikers resuming work is of course largely a reflection of the growing incidence of minor strikes lasting for only a day or less, and which are very common on the coalfields and on the waterfront. It is interesting to observe, however, that the contribution of arbitration to the settlement of the remaining strikes has increased considerably during recent years and in 1955 and 1956 was not far below that of direct negotiation.

The above remarks apply to the situation in industry as a whole only and it is now necessary to consider the situation in particular industries. As Professor Walker's pioneering case study work[3] shows, the influence of arbitration on industrial peace varies according to differences in economic and social conditions in the different industries. Although the industry split-up of the data relating to the settlement of strikes is available since 1951 only, this will nevertheless suffice to indicate the general pattern. These data are given in Table II for coal-mining, stevedoring and other industries.

TABLE II

Methods of Settlement of Strikes by Industrial Groups, 1951–1956

Industry and Year	Direct Negotiation (a)	Under Industrial Acts	Other Methods	Total	Direct Negotiation (a)	Under Industrial Acts	Other Methods	Total
	Numbers				Percentages			
Coal Mining:								
1951–1956(*b*)	182	70	657	909	20·0	7·7	72·3	100·0
1951	190	74	649	913	20·8	8·2	71·0	100·0
1952	280	102	836	1,218	23·0	8·4	68·6	100·0
1953	173	66	705	944	18·3	7·0	74·7	100·0
1954	196	61	684	941	20·8	6·5	72·7	100·0
1955	128	56	592	776	16·5	7·2	76·3	100·0
1956	126	61	477	664	19·0	9·2	71·8	100·0
Stevedoring:								
1951–1956(*b*)	9	42	191	242	3·6	17·5	78·9	100·0
1951	3	43	150	196	1·5	21·9	76·6	100·0
1952	2	32	120	154	1·3	20·8	77·9	100·0
1953	17	46	205	268	6·3	17·2	76·5	100·0
1954	6	32	195	233	2·6	13·7	83·7	100·0
1955	20	58	228	306	6·5	19·0	74·5	100·0
1956	5	43	249	297	1·7	14·5	83·8	100·0
Other Industries:								
1951–1956(*b*)	100	104	99	303	33·2	34·2	32·6	100·0
1951	78	106	48	232	33·6	45·7	20·7	100·0
1952	86	84	79	249	34·5	33·8	31·7	100·0
1953	97	94	53	244	39·8	38·5	21·7	100·0
1954	91	114	104	309	29·4	36·9	33·7	100·0
1955	138	124	183	445	31·0	27·9	41·1	100·0
1956	114	100	127	341	33·4	29·3	37·3	100·0

Source: Labour Reports and Special Returns of the C.B.C. & S.
(a) Includes Mediation.
(b) Annual Averages.

3. *Industrial Relations in Australia* (Harvard, 1956).

Two important conclusions emerge from an examination of these data. In the first place there are considerable variations in regard to methods of settlement as between these three industrial groups. In coal-mining and stevedoring the majority of strikes have been settled by the strikers resuming work but the relative importance of negotiation and arbitration in the first of these two industries during these six years (20 per cent and 7·7 per cent) is the reverse of what it is in the second (3·6 per cent and 17·5 per cent respectively). In the remaining industries however these three methods are almost of equal importance.

Secondly, these figures do not reveal any definite trend in regard to methods of settlement within these particular industrial groups. Unfortunately no information is available for the years prior to 1951 but this lack of trend in these industrial groups since then points to the fact that the change in the relative importance of the various methods of settling strikes in industry as a whole during the past six years, as revealed in Table I, was largely due to changes in the industrial composition of aggregate strike data and not to changes in methods of settlement within particular industries. Table III gives the distribution of strikes as between these three industries in each year since 1946.

TABLE III

Industrial Distribution of Strikes
1913–1945 and 1946–1956

Year	Coal-Minning	Steve-doring	Other Indus-tries	Total	Coal-Minning	Steve-doring	Other Indus-tries	Total
	Numbers				Percentages			
1913–1945(*a*)	272	17	114	403	67·4	4·4	28·2	100·0
1946–1956(*a*)	866	165	228	1,259	68·8	13·1	18·1	100·0
1946	684	50	135	869	78·7	5·8	15·5	100·0
1947	818	41	123	982	83·3	4·2	12·5	100·0
1948	974	42	125	1,141	85·4	3·7	10·9	100·0
1949	644	96	109	849	75·9	11·3	12·8	100·0
1950	953	128	195	1,276	74·7	10·0	15·3	100·0
1951	913	196	232	1,341	68·1	14·6	17·3	100·0
1952	1,219	154	250	1,623	75·1	9·5	15·4	100·0
1953	944	268	244	1,456	64·8	18·4	16·8	100·0
1954	941	234	312	1,487	63·3	15·7	21·0	100·0
1955	776	308	445	1,529	50·8	20·1	29·1	100·0
1956	664	297	343	1,304	50·9	22·8	26·3	100·0

Source: Labour Reports and Special Returns of the C.B.C. & S.

(a) Annual Averages.
(b) Total strikes occurring in any one year will not necessarily correspond with totals settled in the same years (Table I).

These figures show that some important changes, both absolute and relative, have occurred in the industrial distribution of strikes since the war, but it is with the relative changes that we are mainly concerned. Thus we find that during the early post-war years the proportion of strikes in coal-mining increased while those in stevedoring and

other industries decreased somewhat, but from 1949 onwards these trends have been reversed. Bearing in mind the different patterns of methods of settlement in these industries (see Table II) these structural changes in the composition of the aggregate data up to 1948 would have the effect of raising the proportion of strikes settled by direct negotiation in industry as a whole. But as was shown above (Table I) the relative importance of direct negotiation declined steeply while that of arbitration and other methods rose from 1946 to 1948. This suggests that there was some substitution of one method by another in particular industries during these years. From 1949 onwards it would appear that the shifts in the relative importance of the various methods of settlement in industry generally is due largely to changes in the industrial distribution of strikes. It would be necessary, however, to have a more detailed industry split up of the data, over a longer period, in order to arrive at any firm conclusions regarding methods of settlement of strikes in particular industries.

Workers' Economic Position

While recognizing that the Australian labour force is more highly unionised than either the British or American, Professor Walker (page 63) does not consider whether or not this might be due to any advantages which the system of compulsory arbitration may have over voluntary collective bargaining from the point of view of the economic betterment of Australian workers. Although he has discussed elsewhere[4] the influence of arbitration upon real wages he evades the issue altogether in this article. Even if we leave aside the more involved issue as to whether the general level of real wages and the relative share of wages in the proceeds of industry might have behaved differently under a system of voluntary collective bargaining, something useful can still be said regarding other aspects of the impact of compulsory arbitration upon the economic position of wage and salary earners.

The fact that arbitration law enables any registered union to have its wage claims determined by an arbitration tribunal has greatly strengthened the bargaining power of formerly unorganized or weakly organized groups of workers and thereby enabled them to have their wages and related conditions brought up to prevailing standards. The formulation of the "Harvester" basic wage in 1907 by the Commonwealth Arbitration Court was particularly important in this respect since it explicitly recognized that this wage of 7/- per day (42/- per week) was to become the standard minimum rate for unskilled labour in all federal awards. At that time 42/- per week was the accepted trade union rate for a labourer in the building trades which were already well organized but a wage as low as 30/- per week was not uncommon in certain unorganized trades and undertakings. Much evidence could be quoted to show that the "Harvester" standard was also widely adopted by the various state tribunals shortly after its inception in 1907. Since then the incidence and influence of federal wage standards

4. *Industrial Relations in Australia*, pp. 325-328 and 366-367.

(basic wage and margins) have grown very considerably and, as a consequence, award rates of pay for given occupations have become remarkably uniform over the economy as a whole.

Compulsory arbitration has also enabled the majority of wage and salary earners in the public sector in the poorer or "claimant" States of the Commonwealth to secure much the same rates of pay as their opposite numbers in the wealthier States. Indeed in Western Australia workers covered by state awards have for many years received a higher basic wage than workers covered by federal awards! Moreover, state governments themselves have shown a decided preference for arbitration for their own employees not only because this is the recognized method of wage and salary determination in this country, but also because under our unique system of federal-state financial relationships increases in a state government's wages bill which result from a decision of an arbitration tribunal can more readily be passed back to the Federal Treasury. Furthemore, the system of automatic cost-of-living adjustments of the basic wage was an important factor in helping to maintain real wages for all workers during periods of rising prices.

On the other hand, of course, the strong unions might have been able to secure greater gains for themselves under a system of voluntary collective bargaining, at least during the recent post-war period of over-full employment, as witness the incidence of over-award payments in these years.[5] Be that as it may, the same could hardly be said of the other unions, more particularly those representing the white collar workers. Indeed the experience of certain profesional workers, such as university staffs, who have remained outside the arbitration system strongly suggests that white collar workers and other non-militant groups whose salaries are determined by arbitration tribunals would have been a good deal worse off under a system of voluntary collective bargaining.

Trade Union Developments

Finally, mention should be made of the profound influence which compulsory arbitration has had upon trade union developments in this country. Although Professor Walker discusses this point elsewhere[6] he omits reference to it in his article. And yet it is important. In the first place, the economic gains and legal protection accruing to workers and their unions under arbitration law has provided a powerful stimulus to the growth of Australian trade unionism. Thus in 1901, the year in which compulsory arbitration was first effectively established, total trade union membership was only 97,000 or about 6 per cent of the paid labour force, but these figures increased fourfold during the next decade. Since then trade unionism has continued to expand, apart from

5. The discrepancy between average earnings and rates which has occurred in Australia and elsewhere since the war is of course only partly due to payment of over-award rates in certain instances. Upgrading of workers, overtime and the introduction of incentive wages schemes of various kinds have also been important contributing factors.

6. *Op. cit.*, Chapter IX.

a temporary setback during the depression of the 'thirties, with the result that Australia is now one of the most highly unionised countries in the free world. This inducement to organize has not been confined to industrial wage earners but has also spread to white collar workers in both the private and public sectors. Nine out of every ten workers are now covered by awards of the arbitration tribunals.[7] An examination of the lists of registered unions shows that most of the important groups of white collar workers are represented: the federal and state public services, scientific and professional organizations, school teaching, nursing, banking, insurance, wholesaling, retailing, police and clerical. In fact, only a few groups, such as the judiciary, churches and the universities are not included.[8]

Secondly, the centripetal attraction of federal awards has fostered the development of union organizations on an interstate and national basis. The number of unions covering two or more states rose from 72 in 1912 to 139 in 1954 and their share of total membership from 65 per cent to 93 per cent respectively. Moreover there has also been a definite trend towards complete national coverage, the number of unions operating in all six States rising from 10 representing 30 per cent of membership to 58 with 48 per cent of membership over the same period. Many of the interstate and national organizations are merely federations of unions, some of which negotiate for federal awards while others merely function as co-ordinating agencies of their respective branches in their negotiations for state awards.

Thirdly, Australian arbitration laws give governments a far greater measure of control over the internal and external affairs of their trade unions than does the labour code in any other democratic country with the possible exception of New Zealand where the situation is very similar to our own. In other words Australian trade unions are not the same free associations of workers as are the British or North American trade unions.

Summary

To sum up: (1) The contribution of arbitration to the settlement of strikes varies very considerably as between different industries. In industry as a whole, the contribution of arbitration has risen very appreciably since the war but it would appear that this is due more to changes in the industrial composition of aggregate strike data rather than to a substitution of arbitration for other methods in particular industries. A more detailed industry split-up of the data over a longer period of years would be required in order to reach any firm conclusions on this point. If account be taken of the disputes settled by the industrial tribunals before culminating in strike action, then the

7. Quarterly Business Survey of the C.B.C. & S., Feb. 1956.

8. Staff Associations have now been formed in all Australian universities mainly for the purpose of negotiating with their respective governing bodies in regard to salaries and related matters but so far only one of these has referred its salary claims to an arbitration tribunal for determination.

contribution of this institution towards industrial peace would be even more significant than indicated by the preceding analysis. (2) Apart from any influence which it may have had upon the course of the general level of real wages over the past half century, there can be no doubt that compulsory arbitration, as it has operated in this country, has been a powerful factor in bringing about a greater degree of relative wage justice in the sense that it has facilitated the application of the "rate for the job" principle on a national basis. This has been particularly beneficial to the weakly organized groups including the white collar workers. (3) Australian trade unionism owes much to the arbitration system in terms of its enhanced membership and extensive interstate and national coverage. (4) As against these substantial gains it must be recognized that under existing arbitration law, Australian trade unions are less free than are those in either the United Kingdom or the United States or indeed in any other democratic country except New Zealand.

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THE EFFECTS OF PRICE CONTROL IN NEW ZEALAND

There was a good deal of price control in New Zealand after the war: fixation of maximum prices for many commodities under the Control of Prices Act, fixation of maximum rents for dwellings, fixation of maximum rates of interest, fixation of public-utility prices.[1] The present paper is an investigation, for the period 1951–1956, into the effects of price control in N.Z. on market equilibrium, on the quality of goods and services, on the allocation of productive resources among the branches of economic activity, and on productive efficiency.

1. *Market equilibrium.* According to economic textbooks the usual effect of fixing prices is disequilibrium of supply and demand. The setting of a maximum price will create "excess demand"; the public complains of "shortages"; there are queues in front of shops, bottlenecks and delays in the process of production. If the commodity concerned is of any importance, the government will have to introduce some sort of rationing in order to distribute the quantity supplied as fairly as possible among the claimants for it. Were these effects noticeable in N.Z.? Yes, but only in a small number of markets: in the market for long-term finance, where rationing continued (Capital Issues Committee, Local Government Loans Board); in the "market" for bank accommodation, where the trading banks, under the pressure of

1. H. G. Lang, "Price and Wage Policy", in *Economic Stability in New Zealand* (R. S. Parker, ed., Wellington, 1953), estimated that price control in some form operated over about two-thirds of average household expenditure (the estimate presumably refers to 1953). Forty-five per cent of consumer expenditure represented in the Consumers' Price Index was controlled under the Control of Prices Act; about seventy-five per cent of all consumer expenditure was covered by the Index.

the Reserve Bank, applied some informal rationing to demand;[2] in the market for new motor cars, where there were waiting lists (very long ones for some makes);[3] in the "market" for telephones, also characterized by waiting lists,[4]; in the market for rental houses, where especially families with young children often found it very difficult to satisfy their demand for a home because owners had so many applicants that they could pick and choose their tenants;[5] and sometimes in the market for building materials, where there were complaints (decreasing over the years) of "shortages", with the result of delays in building.[6] Probably there were some other cases of disequilibrium, but they were few. In everyday life the ordinary consumer was not often bothered by "shortages" due to price control and the ordinary business man was plagued by them only to a small extent.

How is it to be explained that market disequilibrium was not more widespread? First it may be due to the fact that price control under the Control of Prices Act was, on the whole, rather liberal.[7] Second, the equilibrium of supply and demand is in reality probably less precise than in the diagrams on the pages of economic textbooks; in reality it is probably more a "zone" than a "point".[8] Third, many markets are

2. This may be deduced from the submissions of the chairman of the Associated Banks in New Zealand to the Royal Commission 1955 (see *Proceedings*, pp. 445, 446); it may also be deduced from what one could hear about unsuccessful applications for bank advances, of restriction of overdrafts, etc.

3. The second-hand car market was not controlled with the result that prices for second-hand cars were high relative to the prices for new cars. It was possible to sell a good low-mileage second-hand car at a price higher than the list price.

4. In 1955 there were 45,000 names on the waiting list (*P.D.* 1955, p. 1406). The present writer was on a waiting list from 1950 to 1954, although he "enjoyed", as he was told, priority.

5. There are long waiting lists for state rental houses, let by the government at comparatively low, sometimes very low rents. On absolute standards the housing situation was quite satisfactory, for in 1951 the average number of occupants per dwelling (Europeans) was only 3·61 (*Year Book*, 1954, p. 598; the great majority of the dwellings had four to six rooms). The corresponding figure for 1936 is 3·96; in that year no complaints of a housing shortage were heard, so that it is safe to conclude that the complaints of a shortage in the 1950's had something to do with rent control.

6. In his Report over 1954-55 the Commissioner of Works, acknowledging an improvement of the situation in recent years, nevertheless complains of "frequent cases where contractors or departmental works are held up for material". (1955 Ministry of Works Statement, *P.P.* D-1, p. 16.)

7. According to H. G. Lang, *loc. cit.*, the Price Tribunal took as its standard a return, after taxation, of 6 to 8 per cent on shareholders' funds, judging, however, each case on its own merits and deviating from the standard on account of any special circumstances that might be present. It happened not infrequently that prices approved by the Tribunal (or by its delegate, the Price Control Division of the Department of Industries and Commerce) conformed to applications by the firms seeking approval. The element of "black magic" in cost calculation and the natural inclination of business men to use this element to their own advantage may have made price control even more lenient than it was intended to be, although it should be added that the Tribunal reduced its leniency by taking account of historical cost—a basis for price control which in a period of rising prices is less advantageous to producers than replacement cost.

8. "This experience [that price fixing in the U.S.A. often for a considerable period did not seem to lead to disequilibrium of supply and demand] would suggest, to speak somewhat elliptically, that the supply-demand equilibrium is a loose-jointed concept, and that, in the language of an earlier discussion, it is 'indeterminate'"—J. K. Galbraith, *A Theory of Price Control* (H.U.P., 1952), pp. 20-21. The Swiss

"imperfect", and in such markets equilibrium may be theoretically indeterminate between two limits, so that price fixation between those limits would not disturb equilibrium.[9] Fourth, before price control business people and consumers had become accustomed to fixed prices and margins, and somehow economic life had adjusted itself to this.[10] Fifth, it may be assumed that price fixation was sometimes evaded, either legally by a deterioration of quality (see point two), or illegally; not everybody is law-abiding, and it is often very difficult for the authorities to discover and prove contraventions.[11]

2. *Quality.* The authorities may set a maximum price for, e.g. a pair of men's shoes of a certain description, but they cannot ensure that the quality of the shoes is exactly as it should be. Some manufacturers, expecting (not without reason) that they will sell the whole of their output at the fixed prices anyway, may feel tempted to increase their profits by delivering goods of indifferent or poor quality. It is difficult to answer the question whether price control in N.Z. produced this effect to any appreciable extent. Naturally, there are no statistics to help. Only isolated cases come to one's knowledge;[12] they show that the effect did occur, but not its magnitude.

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economist W. A. Jöhr has expressed the indeterminacy of equilibrium in a diagram where the curves of supply and demand are not lines, but ribbons with vague contours (*Theoretische Grundlagen der Wirtschaftspolitik,* St. Gallen, 1943, p. 250). A similar idea is expressed by P. J. D. Wiles, *Price, Cost and Output* (Oxford, 1956), pp. 45 and 57. According to W. Röpke (*Die Lehre von der Wirtschaft,* Zürich, 1943, p. 158) the economic mechanism works with a certain "play" within which free movements are possible without causing reactions.

9. See also Galbraith, *op. cit.,* Chapters II and III.

10. Galbraith, *op. cit.,* Chapters II and III. An investigation among a sample of Auckland manufacturers gave the result that 90 per cent of the sample (comprising 90 manufacturers) stated that they would *not* raise prices following a temporary increase in demand; 61 per cent stated that they would *not* reduce prices following a temporary decrease in demand (G. A. Martin, *Views of Economists and Accountants on Business Enterprise,* unpublished thesis, University of New Zealand, 1954, p. 136).

11. Suppose a timber merchant sells to a builder rimu (red pine) with 45 per cent heart at the price allowed for rimu with 50 per cent heart. In the first place the builder will not lodge a complaint, not only because he voluntarily bought the timber but also because he will be afraid of being penalised if he does so. In the second place the Price Control Division might find it difficult to prove that the timber was sold at too high a price (had less than 50 per cent heart).

12. W. A. J. Perry, *Some Aspects of Price Control in New Zealand* (thesis submited to the University of Otago, 1949), p. 89, mentions reduction of quality in the clothing industry (by reducing the trimmings, skimping the material and other devices) as a reaction of clothing manufacturers to price control. He wrote, however, in 1949, when price control was more severe than in recent years. More recent examples of the influence of price control on quality are the following: (a) Frequently insufficiently dried timber was used for building. The price for well dried timber was set higher than the price of not well dried timber, but timber merchants denied that the margin was sufficient. If builders had not accepted the timber offered to them, they might not have got any at all—there was a "shortage" of timber. (b) The Licensing Control Commission stated in its 1954 report (*P.P.* 4-3, p. 4) that "control of tariffs of higher graded hotels . . . is detrimental and is having an adverse effect on the services and amenities which ought to be provided for guests in these hotels". (c) When tea was again brought under price control in 1955, the President of the New Zealand Wholesale Tea Packers Federation stated that in the long run control could bring about undesirable trends, particularly in regard to the quality of tea (*The Press,* 29th January, 1955).

3. *The allocation of productive resources among the various branches of productive activity.* There is a *prima facie* case for believing that price fixation causes misallocation of resources (unless it is absolutely comprehensive and even in its weight on the various branches, but this is never the case, certainly not in peace time). The argument is, briefly, as follows. If maximum prices are fixed for some products ($a - l$) and not for others ($m - z$), then production of $m - z$ will become more profitable than production of $a - l$, and the pattern of production will be "distorted": resources will move from $a - l$ to $m - z$. If $m - z$ are less essential industries, the economy will drift into the direction of the "milk-bar economy".

There are no signs that N.Z. has become a "milk-bar economy" under the influence of price control. It is unlikely that price control had no influence in the allocation of resources, but it is difficult to find concrete examples of such influence. The only example that the writer is able to give is the decline in the supply of hotel accommodation which is probably due to price control.[13] That there is so little evidence of a "distortion" of the pattern of production under the influence of price control is not surprising in view of the fact that it is difficult, if not impossible, to know what the pattern would have been without price control. If we did know, it would probably appear that price control has not caused any significant "distortion", because: (a) it was very lenient in the period under survey;[14] (b) productive resources are often more or less firmly attached to a certain branch of production by specialization, habit, inclination;[15] (c) price fixation for a certain product a will not necessarily make its production less profitable than production of z (not subject to price control), if a is produced in a monopolistic, z in a competitive situation.

4. *Productive efficiency.* If price control is based on costs of production, any lowering of unit costs will be followed by the setting of a lower price, so that the reward for an increase in productive efficiency is wholly or partially lost; consequently the incentive to increase productive efficiency will be either weak or altogether absent. Worse still, price control as exercised in N.Z. penalizes manufacturers for efficiency, they contend.[16] Price control is frequently based on *individual*

13. The General Manager of the Tourist and Publicity Department stated on 15th October, 1954, that there had been a major loss of hotel rooms in the last 25 years in N.Z., and said that there was no incentive to improve the situation as long as there was price control (*The Press*, 18th October, 1954). It happens that owners of hotels leave part of the rooms unused because it does not pay to have them occupied.

14. Prior to that period, when it was more strict, there was probably more distortion. A student of price control in N.Z. (W. A. J. Perry, *op. cit.*, p. 86) wrote in 1949 that under the influence of price control manpower was being directed to the production of non-essential items selling at high prices (such as fur garments) and the necessary manpower and materials were being drawn away from the production of items more essential to everyday needs.

15. This fact will, of course, be more influential in the short than in the long period. Galbraith (*op. cit.*, p. 62) is of the opinion that price fixation (under limited mobilisation) will not spoil the allocation of resources for at least some time.

16. Perry, *op. cit.*, p. 95.

costs and sets different maximum prices for firms producing roughly the same product. Suppose there are two firms, *A* and *B*, producing electric ranges named "Quick" and "Sure" respectively. *A* is very efficient and produces at low cost, *B* is inefficient and produces at high cost. A will naturally feel penalized for his efficiency if a comparatively low price is fixed for "Quick", allowing him more or less the same rate of profit as is allowed to *B* in the price for "Sure".[17]

The question arises why the Price Tribunal applied price control in this individual manner, if it is likely that it acts as a brake on improvements in efficiency. The answer is that product differentiation and differences in the situation in which the various firms are placed often militate against fixing a single price for all firms in an industry. It is, of course, impossible to set one price for all electric ranges; the range "Sure" is not quite identical with the range "Quick". Suppose that a certain article x is produced (without differentiation) by a firm *A* in Auckland and by firm *I* in Invercargill.[18] *A* is a large firm, enjoying several external economies. *I* is small, and does not enjoy such economies. If the price of x were fixed on the basis of *A*'s costs, *I* would have to go out of business. The result might be that the citizens of Invercargill would not be able to get sufficient supplies of x.

Price control may adversely affect efficiency also through its influence on competition. "Price and profit controls usually lead to sheltered markets and to a decline in effective competition. Firms compete not so much on the basis of price and quality as for favours from administrators or suppliers of scarce goods and services."[19] It is likely that a decline of competition was an effect of price control in N.Z., at least in some of the fields subject to it.[20] If that is so, it is also likely that it exercised an adverse influence on efficiency. It is, however, impossible to give evidence of this, and, *a fortiori*, to ascertain the magnitude of any such influence. This is unfortunate, as an adverse effect on efficiency may be the most important "indirect cost" of price control to the economy.

17. Two questions arise: (a) Will *B* be able to sell his "Sure" at the comparatively high price? (b) Will *A* not expand his factory and drive *B* out of the market? N.Z. experience does not show any difficulty for *B* in the sale of his products; the reason is, we may assume, that in a mildly inflationary situation demand tends to outrun supply. Nor does N.Z. experience show many cases of lower-cost producers driving higher-cost producers out of the market by expansion of their businesses. Price control takes away a good deal of the incentive to expansion. Expansion is a big step, fraught with risk: When inflation comes to a stop, it may appear to be a mistake. In a mildly inflationary situation with price control, there is an atmosphere of "live and let live". It may be difficult in connection with the scarcity of savings and the control of capital issues, to obtain the capital required for expansion.

18. The distance between these centres is great, and coastal shipping is very costly and irregular.

19. C. G. F. Simkin, "Monetary Policy and Economic Stability", in *Economic Stability in New Zealand* (R. V. Parker, ed.; Wellington, 1953), p. 115.

20. G. A. Martin writes in his thesis quoted above (p. 107): "We have seen that prices are controlled or partly controlled for products manufactured by over half of the firms. It is significant that price competition is little or non-existent for an equal number of firms in total and in all trade groups except the metal trade" (pp. 137-8).

There is no cloud without a silver lining. It is probable that price control exercised also a favourable effect on efficiency by making managers more "cost conscious" and inducing them to improve cost accounting. Submissions to the Price Tribunal have to be based on cost calculations. Such an effect would reduce the "indirect cost" of price fixation to the community.[21]

An adverse influence on productive efficiency of a different kind may have been exercised by the control of interest rates, compelling the banks to ration credit. "With the necessity to ration available funds among the many credit-worthy applicants, there is the possibility that bank loans will not always be used to the best advantage. In practice applications for new or increased advances tend to bear the brunt of a tighter policy, and there is a danger that desirable progress may be retarded through lack of flexibility of the system."[22]

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SEASONAL INDEXES IN SOME INDICATORS IN THE AUSTRALIAN ECONOMY

When short term economic forecasts are made on the basis of recent monthly or quarterly data, it is important to know to what extent, if any, seasonal factors are responsible for the levels recorded.

In this brief note I have examined the value of retail sales (excluding motor vehicles, etc.) and a number of components of private investment, viz., new motor car registrations, new commercial motor vehicle registrations, new houses commenced and the value (when completed) of other new buildings commenced, to see whether any regular seasonal patterns could be found. The indexes of seasonal variation were derived by the method of moving averages.* The index for retail sales was calculated using data from the March quarter 1951, the first quarter for which figures were available. For the other series, figures from the March quarter 1949 onwards were used.

Tables I-V show the ratios of observed values to four quarter moving averages for the series selected, and the indexes of seasonal variation.

The above results show that there are fairly distinct seasonal patterns but, except for retail sales, the variation within quarters from year to year is quite substantial. Accordingly, for retail sales the mean value was taken as a basis for the seasonal indexes, whilst for the other series an average of the middle five values was used.

21. The direct cost is small. The cost of price control under the Control of Prices Act was £116,000 in 1953-54. The total cost of price control to the government was probably less than £150,000. The number of officials employed in the Price Control Division of the Department of Industries and Commerce was 169.

22. Quoted from the Statement of the Associated Banks in New Zealand to the Monetary Commission, 1955, p. 19.

* See: Karmel, P. H., *Applied Statistics for Economists* (Pitman & Sons, 1957), pp. 230-237.

TABLE I

Value of Retail Sales

(Excluding Motor Vehicle, etc.)

Ratios of Observed Values to Moving Averages

Year	September Quarter	December Quarter	March Quarter	June Quarter
1950–51			0·9659	1·0043
1951–52	0·9735	1·0943	0·9653	0·9888
1952–53	0·9521	1·1030	0·9437	0·9845
1953–54	0·9632	1·1197	0·9308	0·9781
1954–55	0·9679	1·1127	0·9395	0·9852
1955–56	0·9700	1·1098	0·9439	0·9840
1956–57	0·9652			
Mean value ..	0·9653	1·1079	0·9482	0·9875
Seasonal Index	963	1,106	946	985

Source: *Retail Sales of Goods*, Australia, Commonwealth Bureau of Census and Statistics.

TABLE II

New Motor Car Registrations

Ratios of Observed Values to Moving Averages

Year	September Quarter	December Quarter	March Quarter	June Quarter
1947–48			0·8045	1·0423
1948–49	1·1787	0·9920	0·8529	0·9985
1949–50	0·8779	1·0868	0·9509	1·1056
1950–51	1·0861	1·0225	0·8801	0·9210
1951–52	1·1108	1·0760	0·9719	1·0190
1952–53	0·8448	1·1389	0·8952	0·8871
1953–54	1·0489	1·0934	0·8663	0·9839
1954–55	1·1374	1·0068	0·8674	1·0653
1955–56	1·0957	1·0461	0·9213	0·9305
1956–57	1·0040			
Average of middle 5 items* ..	1·0691	1·0553	0·8861	0·9948
Seasonal Index	1068	1054	885	993

*Average of middle 6 items for December quarter.

Source: *Monthly Bulletin of Business Statistics*, Commonwealth Bureau of Census and Statistics. Includes commercial vehicles registered for private use in Victoria from November 1951.

TABLE III

New Commercial Motor Vehicle Registrations
Ratios of Observed Values to Moving Averages

Year	September Quarter	December Quarter	March Quarter	June Quarter
1947–48			0·8219	0·9718
1948–49	1·1221	1·0723	0·8217	0·9745
1949–50	0·9244	1·1255	0·8983	0·9910
1950–51	1·1116	1·1066	0·8773	0·9207
1951–52	1·1986	1·0095	0·9205	1·0602
1952–53	0·9141	1·0094	0·8803	1·0391
1953–54	1·0658	1·0257	0·8565	0·9913
1954–55	1·1145	1·0644	0·8508	1·0072
1955–56	1·0817	1·0585	0·9208	1·0281
1956–57	0·9937			
Average of middle 5 items* ..	1·0750	1·0562	0·8726	0·9984
Seasonal Index	1074	1056	872	998

* Average of middle 6 items for December quarter.

Source: *Monthly Bulletin of Business Statistics*, Commonwealth Bureau of Census and Statistics. Excludes commercial vehicles registered for private use in Victoria from November 1951.

TABLE IV

New Houses Commenced
Ratios of Observed Values to Moving Averages

Year	September Quarter	December Quarter	March Quarter	June Quarter
1947–48			0·9079	1·0238
1948–49	1·0498	0·9928	0·9793	0·9798
1949–50	0·9635	1·0446	0·9811	0·9779
1950–51	1·0548	1·0074	0·9448	1·0409
1951–52	1·0556	1·0148	0·9918	1·0111
1952–53	0·9452	0·9441	0·9803	0·9980
1953–54	1·0504	0·9905	0·9936	0·9964
1954–55	1·0472	1·0024	0·9457	1·0073
1955–56	1·0580	0·9965	0·9872	0·9685
1956–57	0·9992			
Average of middle 5 items* ..	1·0403	1·0007	0·9747	0·9985
Seasonal Index	1037	997	971	995

* Average of middle 6 items for December quarter.

Source: *Quarterly Bulletin of Building Statistics*, Commonwealth Bureau of Census and Statistics. Includes Northern Territory from September 1954.

TABLE V

Value (when completed) of Other New Buildings Commenced†
Ratios of Observed Values to Moving Averages

Year	September Quarter	December Quarter	March Quarter	June Quarter
1947–48			0·9152	1·1026
1948–49	1·0410	0·9235	0·9484	1·1874
1949–50	0·8967	0·8730	1·1613	0·8086
1950–51	1·0198	1·0358	0·9412	1·1733
1951–52	0·9975	0·9488	0·9553	1·2228
1952–53	0·9375	0·7285	0·9411	1·0713
1953–54	1·0998	0·8382	0·9781	1·1217
1954–55	1·0769	0·8073	1·0785	0·9696
1955–56	1·0947	0·9279	1·0432	1·0023
1956–57	1·1243			
Average of middle 5 Items* ..	1·0460	0·9031	0·9732	1·0942
Seasonal Index	1042	899	969	1090

† Buildings other than houses.
* Average of middle 6 items for December quarter.

Source: *Quarterly Bulletin of Building Statistics*, Commonwealth Bureau of Census and Statistics. Including Northern Territory from September 1954.

Although there are quite marked seasonal patterns in the above series, the indexes are only an indication of an average seasonal variation, and any deflation of individual quarters to obtain deseasonalized values may be subject to a large margin of error. As a general indication, however, they may be quite useful when recent data are being examined as a basis for short term economic forecasting.

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PRODUCTION FUNCTIONS AND CROSS-SECTION SURVEYS[1]

There are two possible production functions which may be associated with a group of firms: namely an *aggregate* and an *average* production function. The aggregate function purports to determine the total output of the group, given the total quantity of the various production factors used by the group as a whole. The average function, on the other hand, is a production function for an imaginary firm in some sense representative of those in the group. These two functions rest on two entirely different assumptions.

The *aggregate production function* exists as a unique function only if each firm in the group can be considered to be in equilibrium.

1. The immediate stimulus for this note was an article in the April 1957 issue of this journal by H. P. Schapper and R. G. Mauldon, "A Production Function from Farms in the Whole-Milk Region of Western Australia", pp. 52–59. The ideas here are, however, a development of some I put forward in correspondence, early in 1957, with Professor H. R. Burrows, formerly of the University of Natal, now Principal of the Fort Hare University College.

If this is, in fact, the case, then there will be a definite amount of product forthcoming from, and definite quantities of the factors used by, each firm in a given price and wage-rate situation. Hence, in this price and wage-rate situation, the aggregate output and quantity of factors used for the group will be determinate, *and they will repeat themselves each time the same price and wage-rate situation recurs*, because all firms will revert to the same equilibrium situation each time this happens. This identical repetition in identical situations produces the unique relationship between aggregate quantities of factors used by, and aggregate output from, the group—although the true independent variables are the prices and wage-rates. This last proviso indicates the conditions under which it might be possible to estimate the aggregate production function: data are required for a series of different price and wage-rate situations. Thus a cross-section survey is ruled out, and one must work with time-series material (with the added complications that this introduces). It will be realized that there is no necessity for the production functions for the individual firms to resemble one another. It will also be realized that the individual production functions will need to remain unchanged during the period in which the investigation is being made—otherwise the nature of the aggregate function will change. This, of course, is one of the complications introduced by the necessity of using time-series data.

The *average production function*, since it is a representative function for the group, implies that there *can be* a representative function. This means that there needs to be some similarity between the individual production functions—in the strictest form, that they should be identical—so that the average function can replace each of the individual functions in order to determine, e.g. whether the factors in a particular firm are being used to their best advantage. The average function is most certainly not identical with the aggregate function. If it were, then it could be derived in exactly the same fashion, and it would work merely by inserting the quantities of factors and the output of one of the firms in the group. However, it does not take much imagination to see that this would imply constant returns to scale, i.e. that the *ratios between* the quantities of factors employed and total output *could* remain the same, irrespective of the actual magnitude of these quantities. The method of estimating this average function must be to assume that each piece of information from a particular firm is approximate information about a point on the average function. The information collected in a cross-section survey will, therefore, be the sort of information required. However, it will be incomplete in the sense that it will provide one point on each individual function for a period during which it may be assumed that the price and wage-rate situation has remained constant (or at least that the variations are not relevant to the information collected). If one may assume an approximation to equilibrium in the various firms, and a similarity in the individual production functions, then the point recorded for each firm will be much the same point on the average function if, for

example, all firms possess the same quantities of fixed factors of production. Only if the quantities of fixed factors vary from firm to firm will the information collected from each appear as approximations to a usable variety of points on the average function.

From here on, the consequences of an attempt to derive an average production function from data recorded in a cross-section survey will be investigated.

One might assume that the ideal conditions for the development of an average production function for a group of firms would be where all individual production functions were identical and, furthermore, were of the same form as that of the average function to be developed. If the average function is of the Cobb-Douglas form, then these ideal conditions will be fulfilled if each individual production function is:

$$P = a \prod_{i=1}^{n} (X_i)^{b_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where P is the Product, $X_1, X_2, \ldots . X_n$ are the factors of production, and where the parameters (a and the b_i) are the same for each firm.

It may be assumed that one of the input factors—say X_n—is fixed for each firm during the time period of the cross-section survey. Thus X_n is free to vary only by movement from firm to firm, whereas the remaining X_i may vary freely within each firm. This means that, within each firm, there will be n-1 equilibrium conditions determining the extent of employment of the X_i excluding X_n. These conditions (marginal product equals wage-rate) will be:

$$\frac{\partial P}{\partial X_i} = \frac{b_i P}{X_i} = W_i \ (i = 1, 2, \ldots . n\text{-}1) \ldots\ldots\ldots\ldots (2)$$

where W_i is the cost per unit of the factor X_i—assumed constant during the period of the survey.

If equilibrium rules in each firm, then the equilibrium values for the X_i, as determined by equations (2), substituted in equation (1), will give:

$$P' = \left[a \prod_{i=1}^{n-1} \left(\frac{b_i}{W_i} \right)^{b_i} \right] \left(\frac{1}{1 - \sum_{i=1}^{n-1} b_i} \right) X_n \left(\frac{b_n}{1 - \sum_{i=1}^{n-1} b_i} \right)$$

$$= K.X_n^{b} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

where the K and b merely replace the complicated constants of the previous line. Equation (3) would be interpreted in the following way: when all the variable X_i within a firm take on their equilibrium values, the resultant product, P', is a function purely of the fixed factor, X_n. Since X_n is free to vary only from firm to firm, equation (3) must obviously be a *scale* equation, with X_n as the *scale factor*. The significance of this is seen clearly when one considers the value of $\sum_{i=1}^{n} b_i$, since:

$$b = \frac{b_n}{1 - \sum_{i=1}^{n-1} b_i} \begin{matrix} < \\ = \\ > \end{matrix} 1 \quad \text{when} \quad \sum_{i=1}^{n} b_i \begin{matrix} < \\ = \\ > \end{matrix} 1$$

implying decreasing, constant, or increasing returns respectively to X_n in equation (3)—remembering that all the other X_i will vary appropriately with X_n to maintain equilibrium.

The way in which the other X_i vary with X_n to maintain the equilibrium will be apparent from a consideration of equations (2), which may be re-written as:

$$X_i' = \frac{b_i}{W_i} \cdot P' \quad [i = 1, 2, \ldots . n - 1]$$

whereby all the variable X_i, when they take on their equilibrium values X_i', will be functions of P' and hence of X_n.

Now, assuming that equilibrium exists in all the firms, the cross-section survey will produce a series of sets of values P', X_1', $X_2' \ldots . X'_{n-1}$, X_n—one set for each firm in the survey, where the values of P' and the X_i' will vary from set to set in a way determined by the change in the value of X_n. In other words, there will be perfect correlation, if all firms are in equilibrium, between the X_i' and X_n. Thus, in the normal correlation procedure to fit an equation to the observed values, one would need to exclude either X_n or else all the X_i' from the fitted equation. Since in practice the main purpose of developing the average function is to calculate marginal productivities for the variable factors, the choice will obviously be to exclude X_n—*vide* Schapper and Mauldon.[2] Thus the equation to be fitted to the observed values will be:

$$P' = A \prod_{i=1}^{n-1} (X_i')^{B_i} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \quad (4)$$

Presumably the average function developed along these lines should bear some relation to the original (identical) individual production functions. One might, for example, imagine that the A and B_i of this equation should reproduce the a and b_i $(i = 1, 2, \ldots . n - 1)$ of equation (1). A little manipulation of equation (4), using the information in equations (2) and (3), will show that this would mean that $X_n \equiv 1$. This is hardly reasonable.

This immediately raises other problems, e.g.: are the A and B_i of equation (4) good estimates of the a and appropriate b_i of equation (1)?; should they be?; and, possibly even more important would the marginal products as calculated from equation (4) be identical with those calculated from equation (1)? The answers to these questions probably depend on the answer to another, more basic, question: do the observed (equilibrium) values of P' and the X_i' actually trace out a relationship of the form of equation (4)? Certainly, a Cobb-

2. *Op. cit.*, p. 54. where the variable X_4—Total Investment—was dropped on the grounds that: "The total variation due to this factor of scale appears to be sufficiently accounted for by the other factors in combination"; a reason which should have warned the authors that perhaps the marginal products of the factors, as deduced from their equation, would include a contribution from the scale factor.

Douglas function could be fitted to the data by least squares, but this is not relevant if, in fact, some other relationship exists between them.

The data can be shown to fit a rather peculiar Cobb-Douglas form of equation, in the following way: equations (2) may be re-written as:

$$P' = \frac{W_i}{b_i} . X_i' \quad [i = 1, 2, \ldots . n - 1]$$

where W_i and b_i are constants. In addition, one may write:

$$P' = \left[(P')^{n-1} \right]^{\frac{1}{n-1}}$$

Using these n equations, one may deduce that:

$$P' = \left[\prod_{i=1}^{n-1} \frac{W_i}{b_i} \right]^{\frac{1}{n-1}} \prod_{i=1}^{n-1} (X_i')^{\frac{1}{n-1}} \quad \ldots \ldots \ldots \quad (5)$$

Where:

$$A = \left[\prod_{i=1}^{n-1} \frac{W_i}{b_i} \right]^{\frac{1}{n-1}}$$

and:

$$B_i = \frac{1}{n-1} \text{ for all } i.$$

Naturally, these results depend on the particular forms of the individual production functions used, but at least for the set of individual functions used here, the A and B_i bear no resemblance to those of equation (1); A, in fact, incorporating information on prices and wage-rates, which is by no means part of the original functions. Presumably a Cobb-Douglas function fitted to the "observed" values used here would conform to equation (5).

There is still the problem of the marginal productivities. How do those derived from equation (5) compare with those for equation (1)?

$$\frac{\partial P}{\partial X_i} \text{ from equation (1)} = \frac{b_i P}{X_i} \ldots \ldots \ldots \ldots \quad (6a)$$

$$\text{from equation (5)} = \frac{\left(\frac{1}{n-1}\right) P'}{X'_i} \ldots \ldots \quad (6b)$$

If the b_i of equation (1) *are all equal*, then they will be roughly equal to $\frac{1}{n-1}$, though in general a little smaller. However, it would be too much to hope that the b_i will be equal; in fact, equation (1) restrains them in no way at all, yet the B_i are necessarily equal.

Now another problem arises; why do marginal productivities from fitted Cobb-Douglas functions always seem to produce results which are the same order of size as the costs per unit of the variable factors? Provided that the values of the b_i do not differ too much from $\frac{1}{n-1}$

then the marginal productivities from equation (5) will be similar in magnitude to those from equation (1)—but, of course, it will not be known whether the equation (5) results are over- or under-estimated.[3] More important, of course, is the form of the Cobb-Douglas marginal productivity expressions, namely B_i times the average products of the factors; hence marginal products will, in general, be similar in order of size to average products, and average products, again, similar to unit costs.

The major question remaining is, of course, can anything be done to produce an average function which will be more reasonable than that of equation (5)? If the conditions assumed right throughout are maintained, the answer is probably Yes! The conditions, which may be recalled here, are that all production functions are identical and that all firms are in equilibrium. These may possibly be relaxed—in practice—to: production functions similar and all firms approximating to equilibrium. Under such conditions, one may again refer to the equilibrium equations (2), writen in the form:

$$P' = \frac{W_i}{b_i} \cdot X_i'$$

A linear correlation between P' and each of the X_i' separately, of the form:

$$P' = \beta_i X_i'$$

would, with known W_i, enable one to estimate b_i direct. Furthermore, the use of equation (3), where most of K and b would now be known, would enable one to find a and b_n. Thus the original equation (1) could be set up. Common sense would seem to suggest that, under the conditions here, equation (1) is the true average function, in that it is representative of all firms.

This procedure would fail, naturally, if it could not be assumed that all firms were in at least approximate equilibrium. For example, if the use of a particular factor was, on the average, biassed above or below equilibrium, then the equilibrium condition of equation (2) would not apply to that factor, whence the correlation to find the relevant b_i would fail. What would be found would be some b_i'' which could be interpreted only as the value that b_i would *need to have* for the observed use to be an equilibrium use. But, of course, this spoils the whole use of the average function, which is designed to discover whether factors are, or are not, being used to their full advantage. A

3. An interesting illustration is given if the equation from the Schapper and Mauldon article is given equal indices for each of the four variables used. The following table compares the marginal products so obtained with the unit costs and with the marginal products obtained in the article:

	X_1	X_2	X_3	X_4
Unit Costs	£640	£1·00	£1·00	£1·00
Marginal Products:				
(a) Equal Indices	619	1·34	5·61	1·20
(b) S & M Indices	579	0·72	1·56	2·65

procedure which implies right from the start that they *are* being used properly will not help.

Another point, which applies where the individual functions are not identical, is that the average function—even if reasonably determined—is after all only an average function. It is hardly legitimate to apply the average function to a particular firm's observed production and use of factors, and maintain that, because the proportions between factors and production in that firm do not coincide with the results required by the average function, that firm is not making the best use of its factors. In fact, of course, it might be in perfect equilibrium *according to its own production function.*

In conclusion, one can say that an average production function *cannot* be derived from cross-section survey data by ordinary least-squares curve-fitting, since the data consists of one point only on each of a number of different production functions. There is no reason at all why a line drawn through the general trend of such points should trace out anything remotely representative of the individual production functions. This is obvious if all the individual functions are of different shapes. However, even where perfect equilibrium has been assumed in each firm, and where the individual production functions are identical, it has been shown that the data from a cross-section survey *do not conform* to any relationship representative of the individual functions.

C. S. SOPER

University of Cape Town.

NEWS AND NOTES

The University of Adelaide's Third Summer School of Business Administration was held in the University on Wednesday, 26th February, 1958, on the general theme "Business and Economic Policy". About 80 business and professional executives attended. The main papers were "Current Problems of the Australian Economy", by Professor R. I. Downing; "Constitutional Restrictions on Economic Policy", by Mr. H. E. Zelling; and "Trade Policy and Australia's Balance of Payments", by Mr. E. A. Russell. These have been published in a small booklet, and are available free on request from the Registrar of the University.

The *Business Review*, a monthly journal, began publication on 15th March, 1958. It is designed to keep businessmen informed about the economic outlook in Australia and abroad, management policies and practices, new techniques and products, developments in marketing, accounting, business law, taxation and office administration. The first issue contains a foreword by Professor Sir Douglas Copland and feature articles on, among other things, the U.S. business crisis, expense control, superannuation for employees and company directors and office automation. The General Editor is Mr. S. R. Brown and the Editorial Board includes Mr. E. L. Wheelwright and Mr. J. R. Wilson, both of the Department of Economics at the University of Sydney. It is published by the West Publishing Corporation Pty. Ltd., Box 3429, G.P.O., Sydney.

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REVIEWS

Applied Statistics for Economists. By P. H. KARMEL. (Pitman, Melbourne, 1957.) Pp. xi + 452. 72/6 Aust.

It is difficult to know whether to congratulate Australia on the production of a statistics text designed for the Australian student, or to regret that its Antipodean slant will lessen its appeal for students in other countries. On the whole the second sentiment prevails, for this is a very good book indeed, and well deserves use throughout the English-speaking world. Research into the review columns of the *Journal of the American Statistical Association* suggests that about two new textbooks on some part of statistics are published every month. Many of these appear to be written in the belief that there is a correlation between academic worth and number of printed pages produced; but collectively they represent a formidable volume of competition. A new text can hope to justify its existence only if it has unusual merits of clarity or of coverage. Professor Karmel's book can be justified on both counts.

The book covers all the subjects usually included in an elementary course for economists, including the construction of index numbers. It also has a chapter on social accounts, a subject often left for separate treatment; this chapter, however, is necessarily related to Australian conditions, and must be used with caution by students elsewhere. There is a good treatment of methods for sample surveys, and also of quality control, so that the book prepares the student for two applications (in market research and industrial control) which he is quite likely to meet in his later work. There is an appendix on the sources of Australian statistics—not merely a list, but a description. Most valuable of all, there is a chapter on demography. Despite its great importance to applied economics, this subject tends to be neglected in undergraduate teaching, because it is regarded as a specialized interest requiring separate treatment. Professor Karmel has managed to distil in seventy pages the essentials of the subject which should be part of every economist's equipment. I would be disposed to criticize his treatment as giving too little space to the basic influences on population structure and growth—what determines the age at marriage, the desired size of family, the spacing of the family, the age at death and so forth—and thus leaving the impression that demography is mainly concerned with the mathematical mysteries of reproduction rates and life tables. But it remains a cause for congratulation that the chapter should be there at all.

The clarity of a statistics text is perhaps best judged by looking at some of the points which cause difficulty and confusion to students. These are to be found in abundance in the theory of sampling. Not merely students, but competent and venerable research workers, often

apply a sampling formula as a mechanical process without considering the logic of what they are doing or the limitations under which their formula is applicable. As a means of achieving clarity, I would award Professor Karmel's chapter an Alpha Minus; the minus because he does not quite manage to bring out the point that the choice of the region of rejection should be thought out in relation to the problem to be solved. But his statement of what sampling theory is trying to achieve, and the care with which he states and sets out his examples, should help many students to avoid the usual errors.

The chapter on regression is also notable for care and lucidity, though I personally regard the treatment of the bivariate normal population as being of an order of difficulty too great for a course of this kind—and likely to encourage the idea that bivariate populations are usually normal. The whole book is alleged in the preface to be based on a course of about fifty lectures, which suggests that Professor Karmel must be both skilful and rapid as a lecturer; I would have said that it contained material for at least seventy-five lectures, and could stand by itself as a statistics text for economics students not specializing in mathematical methods. Professor Karmel rightly does not pretend that statistics can be made non-mathematical, but he is careful to set out his mathematical arguments in full. His book seems assured of a good market, but if he would produce an edition relying on the statistics of Ruritania, instead of Australia, and also a workbook of examples for students to attempt, he might attain the lonely eminence of success occupied by Messrs. Croxton and Cowden.

C. F. CARTER

The Queen's University, Belfast.

The Australian Trading Banks. By H. W. ARNDT. (F. W. Cheshire, Melbourne, 1957.) Pp. vi [+ 2] + 216. 27/6 Aust.

In this book, Professor Arndt has made a welcome addition to the growing stock of literature describing Australian economic institutions. The author is to be congratulated on having managed to compress so much information into 200 pages, which is due mainly to his clear and economical style. He is unusual amongst economists in having indicated the sources from which each of his 21 statistical tables has been derived, which should help any users of the book who in future years would like to keep its statistics up to date.

The book's chief merit is that it gathers together a great deal of information concerning the structure and activities of the trading banks in present-day Australia. Previously economists had to rely on the work of the Royal Commission twenty years ago supplemented by their own contacts with bank officers, in order to find out the details of Australian banking practices, which can often have an important bearing on the interpretation of statistics as well as on the economy's probable reactions to monetary impulses of various kinds. *The Aus-*

tralian Trading Banks should be particularly useful to practising economists as a convenient work of reference.

Anyone familiar with Professor Arndt's reputation in the field of economic policy is bound to be surprised (and perhaps even a little disappointed) at his austerely objective treatment of the subject matter. It is not merely that the author has succeeded in leaving almost no evidence of any political beliefs, but that he takes for granted in his readers a sense of relevance which in fact presupposes a considerable degree of economic sophistication. An undergraduate student will benefit from the book to the extent that he can obtain further guidance on matters of theory and principle from his tutors or other texts. Whilst it may be true (as the Preface hopes) that "no part of the book will be unintelligible to laymen", in the sense that the only technicalities relate to the real world of banking and commerce, the significance of the facts so ably marshalled by Professor Arndt might have been easier to appreciate against the background of an explicit theoretical point of view.

It is not the proper function of a reviewer, however, to tell an author how much better it would have been if he had written a different book. Within his terms of reference, Professor Arndt has succeeded in presenting a great deal of useful and interesting information. An example of new material is the appendix to Chapter I, which examines the distribution in 1954 amongst the eight major trading banks of public company business classified by ten industry groups. In Chapter III there is an admirable discussion of liquid asset ratios and the administration of advance policy. Chapter V renders more accessible Professor Arndt's excellent article, "The Foreign Exchange Business of the Australian Trading Banks", which originally appeared in the *Quarterly Review* of the Banca Nazionale del Lavoro. Chapter VI examines the problems of bank profits and inner reserves, and ends with the question "whether it is not time that the Royal Commission's recommendations on disclosure of bank profits were put into effect . . ."

The reviewer has only one specific grumble. In Chapter II, Professor Arndt compresses his discussion of a variation in the total volume of current account deposits into a single paragraph on page 35, which is excused with a reference to Sayers' *Modern Banking* and the statement that "it is in no way peculiar to the Australian banking system". Although this may be true enough, the interaction of the various deposit-creating factors mentioned briefly in this paragraph seems potentially important enough to warrant greater emphasis and more extensive treatment.

All that remains is to wish this book a long and successful run in its proper role as a necessary (though not a sufficient) text for students and others interested in the monetary aspects of the Australian economy.

G. G. Firth

University of Tasmania.

Broadcasting in Australia. By IAN K. MACKAY. (Melbourne University Press, Carlton, Victoria, 1957.) Pp. vii + 216. 25/- Aust.

Probably nobody knows exactly how far we Australians depend on radio for our emotional and mental diet. But in the last twenty years the dependence must have been considerable. It therefore seems mildly remarkable that we should have taken radio so much for granted, like the weather, and that there should have been so little serious discussion and writing about it.

Those who want to reflect on the way radio may be influencing our emotional and mental climate should read Mr. Mackay's book. It is a clear, competent, candid and fair-minded survey of Australian broadcasting by a successful commercial broadcasting executive. There is a marked difference between the parts of the book that deal with the Australian Broadcasting Commission and those that deal with commercial broadcasting. In writing about the problems of the commercial stations the author is on his home ground. His attitude towards commercial broadcasting seems to me to be exactly right. It is not sanctimonious. He explains that during the 1930's commercial broadcasting "was learning the facts of life—that their form of broadcasting was show business plus advertising". Commercial stations must not fall for any nonsense about culture. It is their job to entertain listeners in the way they want to be entertained. This does not mean that they are irresponsible. It simply means that they have to earn their living by satisfying their customers, and since the customers are generally family circles, the programmes must not infringe the prevailing code of morals and manners. Mr. Mackay's success story about the Macquarie network, and the role that Mr. Jack Davey played in it, is fascinating first-hand reporting.

The chapters on the A.B.C. and its problems read rather like a long interview with Sir Richard Boyer (whom the author thanks for his help), and perhaps shorter interviews with Mr. Charles Moses and the senior executives of the Commission. Mr. Mackay, of course, could not have gone to better sources of information, but these parts of the book have a touch of the secondhand and of official reticence about them.

Mr. Mackay is rightly and properly interested in the question of the A.B.C.'s "independence". He points out that the 1942 and 1948 Broadcasting Acts seem to ensure that the Commission shall be increasingly free of any ministerial pressure on its broadcasts on controversial subjects. Yet he points out that since 1948 the Commission has had to depend on annual appropriations for its income. But he does not seem to follow this analysis through. Surely the realities of the situation are fairly clear. The Broadcasting Acts seem to leave decisions on "political" and "controversial" broadcasts to the Commission. But this is surely the appearance rather than the reality. The hard facts are that the Commission depends on the approval or good will of the Minister—or the Cabinet—for its income from year to year, and the

members of the Commission equally depend on the good will of the Minister or Cabinet for their reappointment. In these circumstances it is hardly necessary for any Minister who wants to influence "political" or "controversial" broadcasts to put anything in writing. He can make his feelings clear on the telephone or in other ways that need not be officially recorded. A strong Commission will of course resist improper ministerial pressures.

Mr. Mackay summarizes the short history of the overseas service, now administered by the Commission as Radio Australia. He recalls how this short-wave broadcasting was shuffled between the A.B.C. and the Department of Information during the war years, and rightly observes that these switches must have been bad for it. He quotes, with apparent disapproval, a statement I made when I was the controller of this service that it was better for it to belong to Information than to the Commission. The controversies of those days seem rather faded now, but I recollect that in the early years of the war I did feel that the A.B.C. was not then fitted to do the special war-time propaganda job of the overseas service. This work needed a different kind of staff, people who not only were expert in the language, but had some understanding of the culture and political circumstances of the foreign countries where we were trying to influence opinion. Radio programmes that might be smash hits in Australia might fall flat in Thailand or Indonesia or Japan. But as time went on, and after we had built up our own specialist staff, I came to feel that the overseas service would be better off as part of the A.B.C. administration, than as part of an Information Department that was beset by repeated domestic crises. For the last two years of my work in this post we were a very happy part of the A.B.C., and I was strongly opposed to the return of short-wave to Information in 1944. Mr. Mackay states that it is today "unthinkable" that the A.B.C. should not "control" the overseas service. I would suggest it is not as simple as that. There is an important difference between administering a service and controlling its policy. The Department of External Affairs provides regular, organized political "guidance" to Radio Australia. It is of course inevitable that the foreign office of any government will be deeply concerned with the political tone and content of broadcasts directed overseas, particularly if made by a public body. Yet it seems evident that the overseas service of the B.B.C. does not feel the need to the same extent as Radio Australia to reflect the government policy of the moment. During the Suez crisis, for example, the overseas service of the B.B.C. broadcast some very strong criticisms by individual commentators of the resort to force against Egypt, as well as putting the Government's case. That sort of thing could hardly happen on Radio Australia. This question of the political control of overseas broadcasts is very complex, and there is no simple solution. But it may be worth while asking whether the B.B.C.'s exceedingly high reputation in so many parts of the world for reliability and objectivity may not be partly due to its relative

freedom from Foreign Office guidance. In the long view the building of such a reputation may be the best way an overseas broadcasting service can serve the national interest.

W. MACMAHON BALL

University of Melbourne.

Legislative, Executive and Judicial Powers in Australia. By W. ANSTEY WYNES. (Second Edition.) (The Law Book Company of Australasia, Sydney, 1956.) Pp. lxiv + 768. £4/15/- net Aust.

This book is more than a long overdue second edition. The first edition, published in 1936, treated of Legislative and Executive Powers. This edition not only brings that treatment up to date through the developments of the ensuing twenty years, but it includes two new chapters dealing with the Judicial Power.

As was the first edition, this is a lawyer's book. The author proclaims it as such in his preface and in his choice of quotations at the very beginning. In his preface he says: "As before, the work remains a legal textbook—as one reviewer of the former described it, 'raw material'." It is concerned with the law of the Constitution as discovered from the judgments of the courts. The author's approach is analytical, precise and conservative. As such the work is an excellent one, indispensable to the constitutional lawyer as the only up to date textbook of value in the field.

For the casual reader the treatment is forbidding. For those primarily interested in problems of government, of politics or of economics, or for those seeking speculative stimulation there is little to be found here. The author did not intend there to be. He has not addressed himself to such people unless they first wish to understand in detail the authoritative law of the Constitution as seen through the eyes of an analytical lawyer.

D. P. DERHAM

University of Melbourne.

Outline of Monetary Economics. By A. C. L. DAY. (Oxford University Press, London, 1957.) Pp. xiii + 559. 55/6 Aust.

The teacher of economics faces an eternal dilemma. It is impossible to give an adequate account of any one branch of the subject without a good deal of trespassing into others. Mr. Day has solved this problem by trespassing thoroughly. So much so indeed that the title of his book might well be misleading to those who think of Monetary Economics solely as the study of interest theory, banking and certain aspects of government policy. Mr. Day's work in fact ranges over the whole field of Macro Economics, the only notable omission being any reference to theories of growth.

The book is divided into seven parts. Monetary Economics proper is covered in the first three parts. A large section of Part II is also

taken up with an introduction to employment theory which is later developed in Parts IV and V into an account of the twin phenomena of inflation and business cycles. Parts VI and VII deal with international aspects. Part VI is largely theoretical and attempts to cover in a shortened and simplified way much of the work of Professor J. E. Meade's "Balance of Payments". The effects of exchange rate and other autonomous changes both on the level of employment and the balance of payments are described. International banking mechanisms and the effects of direct controls are also considered. Part VII gives a descriptive account of pre and post war international monetary experience.

Apart from Part VI this is a book which can be safely recommended to students at an early stage. Mr. Day has made great efforts to find really simple methods of exposition. His treatment of employment theory is particularly successful in this respect. Inevitably however there are some lapses. The reader for example (p. 385) for whom it is necessary to explain the meaning of the term "elasticity of demand" is unlikely to make much of the footnote referring to the income and substitution effects of Hicks and Allen. This footnote and other similar qualifying statements designed presumably to protect the author from the criticism of more sophisticated readers might well have been omitted.

The remarks above apply particularly to Part VI which is very uneven in the level of knowledge it assumes. Moreover, in general, this section is more difficult than the rest of the book. It should, however, provide useful preliminary reading for the student about to tackle Professor Meade's work on the same subject.

On the whole this book will prove a valuable addition to the undergraduate's library.

I. F. Pearce

Australian National University.

Essays in the Theory of Economic Growth. By Evsey D. Domar. (Oxford University Press, New York, 1957.) Pp. ix + 272. $4·50.

Generally speaking, only a brave man will allow his old papers to be pulled out of journals and republished in book form. In the process the work can lose something of its originality because a series of journals does provide the general context in which the various topics were debated. When published as a book, such papers may seem more dated than would be justified by the existing state of the debate. However, Professor Domar escapes much of the usual criticism associated with the republication of past efforts because the papers in this volume are of recent vintage—the oldest dates from 1944—and his work has been at the basis of much of the recent discussions on economic growth. For much the same reasons we will confine our remarks in this review to three matters.

In the foreword Professor Domar mentions the limitations in so many of the models which treat capital as the only explicit factor of production. While he admits an ever-guilty conscience for not employing a more complex production function, his arguments against such a course seem to lie in the difficulties of handling such a model. Yet, if a Cobb-Douglas production function with an additional factor for technical progress is incorporated in the Domar models, one can get some useful results about the relation between the growth of the labour force and technical progress on the one hand and capital and income on the other.

Secondly, in his paper on "A Theoretical Analysis of Economic Growth" Professor Domar suggests, amongst other things, the urgent need for more data on the patterns of growth in various countries. While most of us would agree with these sentiments, it is an entirely different matter to think that these figures can be interpreted usefully. A re-reading of these essays is a timely reminder of the severe handicaps in this sphere; economic historians, competent as they may be, would be well advised to ponder their interpretations of comprehensive statistical series.

The final paper, previously unpublished, in this volume—"A Soviet Model of Growth"—is based upon some work carried out in the late 'twenties by the Russian economist G. A. Fel'dman. This article is well worth reading. The distinguishing feature is the division of the economy into two sectors; one producing capital goods and the other consumer goods. A significant result is the ramming home of the important role of those industries producing capital goods. If these do not exist then the scope for developing an economy is most limited. Investment in those outlets requiring the least capital per unit of output will not necesarily be the most fruitful.

W. P. HOGAN

Australian National University.

Taxes, Tariffs & Subsidies. By J. HARVEY PERRY. (Toronto University Press, 1955.) 2 Vols. Pp. xviii + 763. $25·00.

Two weighty volumes on the fiscal history of even a sister Dominion might well seem forbidding to many besides the general reader. In fact the volumes under review make lively and stimulating reading for anyone with a genuine interest in public affairs. The author divides the history of taxation in Canada into successive periods and provides separate chapters for federal, provincial and municipal developments. Launched in 1867, after the American Civil War had led to a deterioration in political and commercial relations with the United States, the Canadian federation was almost immediately caught in the Great Depression of the 70's. It was in these circumstances that the young Dominion adopted its "National Policy" of protection, and for fifty years the tariff provided two-thirds of its revenue. In the First

World War, corporation and personal income taxes were imposed and the sales tax followed shortly afterwards, but (as in Australia) it was the exigencies of the depression of the 30's and of the Second World War which raised these "new" taxes to their present status of major revenue earners.

The "tariffs" referred to in the title are customs duties, not public utility charges; and the "subsidies" are unconditional grants from the federal to the provincial governments, not hand-outs to producers or consumers. The discussion of "subsidies" is in fact rather brief, being confined to the last 50 pages of the text. At least one reader would have liked to have seen this section expanded, but even so the author provides a useful summary of the history of the statutory subsidies, the recommendations of the Rowell-Sirvois Commission, and the War and Post-War Tax Rental arrangements.

Perhaps the chief contrasts with Australia are to be found in the development of provincial and municipal taxation. After much experimentation in the nineteenth century with income taxes, personal property taxes and the "single tax", the municipalities now rely principally on real property taxation, the level of which is substantially higher than in Australia. This is because in Canada schools, hospitals and welfare services are generally provided by local authorities, with the assistance of provincial grants-in-aid. The provinces themselves are less dependent on federal grants and have access to a wider range of revenue sources than the Australian states. All provinces except Quebec accept federal grants in lieu of personal income tax, and all except Quebec and Ontario accept such grants in lieu of corporation income tax. Income taxes, however, were not generally adopted by the provinces until the 1930's and never formed so large a proportion of their revenue as was the case with the Australian states.

Among the other sources of revenue open to the provinces three may be mentioned as especially significant. In the first place royalty charges, or taxes in lieu of royalties, on forestry, mining and oil drilling are relatively heavy. Secondly, after a brief spell of prohibition during the First World War, the provinces took over the distribution and retailing of liquor and now enjoy the profits therefrom. Thirdly and even more important, the provinces' constitutional right to levy "direct taxation" has been interpreted to cover the levying of petrol taxes and retail sales taxes. Some explanation of the legal background would have been desirable here, at least for the benefit of non-Canadian readers.

This scholarly work concludes with a chronological summary of the Main Events in Taxation (over a period of 304 years), 195 pages of statistical tables and a 38-page bibliography. The Australian reader is left wondering when any work on a comparable scale is likely to appear on Australian fiscal history.

W. PREST

University of Melbourne.

Economic Policy: Principles and Design. By J. TINBERGEN. (North-Holland Publishing Co., Amsterdam, 1956.) Pp. xxviii + 276. 53/- stg.

Two major assumptions underly the whole approach of this volume to its subject. One is that economic policy can form a subject in its own right and is distinct from economic analysis, which then becomes its handmaiden. This is not new. But it is certainly pleasing to see the growing emphasis being placed on this distinction and the development of the subject. The main contribution of this volume here is the thoroughness with which the outlines of the subject are traced.

The second assumption will find less ready universal acceptance. It is to the effect that human affairs, at least in some of their aspects, can adequately be analysed in terms of mathematical symbols. The author himself would be among the first to resist a rigid insistence upon this assumption and he does clearly and without equivocation point out, at least in principle, the deficiencies of the mathematical technique. But it cannot be denied that this technique can, in proper hands, serve a useful, if somewhat limited, purpose.

Throughout Chapters 3 to 6 (8 is the last) 21 models are used for the analysis of 37 problems. Two chapters are devoted to quantitative policy, one in a closed economy and the other for an open economy and for sets of economies. Chapter 5 deals with qualitative policy and Chapter 6 with "Reforms: Changes in Foundations". There is the balanced budget theorem in Chapter 3, and other familiar problems throughout. There is constant attention to full employment as an aim of policy, either on its own or jointly with balance of payments equilibrium and sometimes with monetary or price stability also added. There is also some concentration on public expenditure as an instrument of policy as may be expected but it is taken jointly with other variables as often as singly; other variables, however, are not as often taken singly or independently of public expenditure as might have been useful.

A novel feature of the foreword is an enumeration of what is new in the volume; but very little is listed. This assumes an acquaintance with the author's other works which, perhaps, not many can claim. Most of the models, for instance, have apparently been used elsewhere; so has the content of Chapters 1 and 8 on the subject of the theory of economic policy. In some respects, indeed, this topic would seem to have been covered more thoroughly in an earlier paper by Professor Tinbergen, "On the theory of Economic Policy".

Perhaps the most important feature of this volume is the attempt to devise a rational approach to the determination of policy in its every aspect—covering quantitative policy, structural problems and even the testing of the very foundations of society—and having regard each time to the circumstances involved. There is also a plea to apply objectivity and rational thought to the fundamental questions of our

day, keeping them in an appropriate context, and to substitute thought for emotion.

R. H. SCOTT

Sydney.

The United States Capital Position and the Structure of its Foreign Trade. By M. A. DIAB. (North-Holland Publishing Company, Amsterdam, 1956.) Pp. 67. 10 guilders (20/-).

Professor Leontief, by applying his input-output technique to 1947 American data, found America's exports to be labour intensive while its imports were capital intensive. These findings have since caused puzzlement and controversy in many quarters.

Mr. Diab's study is a critical evaluation of the methods and statistics used by Leontief. Although he suggests and uses a different capital coefficient for American agriculture in 1947 his figures still seem to support Leontief's conclusion. This seems to contradict the general belief, based on Ohlin's theory, that trading countries specialize in the export of commodities that are produced by their relatively most abundant factors of production, which, in the case of America, is generally assumed to be capital.

Leontief himself, unlike some others such as Romney Robinson, did not query Ohlin's theory but explained his findings by saying that the American worker is so productive compared to others, that in spite of the great availability of capital in that country, labour is still relatively abundant. Mr. Diab, statistically testing Leontief's explanation, on the basis of Colin Clark's figures, also finds that the United States is less endowed with capital per "American" worker than most other countries. However, he points out that a great deal of capital is required to educate and train a highly productive industrial labour force.

Like Haberler, Mr. Diab is inclined to ascribe the apparent divergence from Ohlin's theory to differences in the availability of natural resources rather than to those in labour productivity. He also stresses that American direct investment in economic activity abroad complicates the true trade picture.

He finally suggests that, in deriving capital and labour coefficients, it would be much better to work on a value-added than on a product-value basis.

A. J. REITSMA

University of Queensland.

Trade and Market in the Early Empires. Edited by KARL POLANYI, CONRAD M. ARENSBERG and HARRY W. PEARSON. (The Free Press, Glencoe, Illinois, and the Falcon's Wing Press, 1957.) Pp. xviii + 382. $6·00.

This book consists of a number of essays by authors in the fields of Economics, Anthropology, Sociology and Assyriology. The purpose of the book is to examine the nature of the marketing function in

earlier civilizations in comparison with the supply-demand-price mechanism characteristic of modern self-regulating markets. The view of the authors is that it has generally been assumed that markets in past civilizations have been of this self-regulating type, whereas in fact they were not, and that this has led to a failure to understand their economies. The authors briefly describe trade in such civilizations as Babylonian, Egyptian, Aztec-Maya, Berber and Indian and show how trade in their markets was conducted. No claim is made that these studies are exhaustive; the authors freely admit that there is much yet to discover about trade in the ancient world. Rather is it their purpose, in publishing this book, to introduce into the examination of past economies concepts other than those familiarly used in examining our own.

A section of the book is devoted to a discussion of the relationships of such studies as economics and anthropology with each other and their place in the study of general sociology. This section of the book is exploratory and many readers will no doubt have reservations about some of the views expressed. To this reviewer the most interesting and satisfying part of the book is that dealing with ancient markets.

H. R. RODWELL

University of Auckland.

United States Imports and World Trade. By HENRY G. AUBREY. Oxford University Press, London, 1957.) Pp. x + 169. 39/3 Aust.

The major part of this book is an estimation of United States imports for a normal year in the mid 1970's. The origin of imports in this typical year is also appraised leading to a discussion of the world trade patterns that will be necessary if the present "dollar-deficit" areas are to overcome their dollar shortages. Future imports were estimated by consulting experts. The Paley Report's estimates of future requirements and domestic production "were used as a point of departure in interviews with a large number of outstanding commodity experts in industry, banking and government who were asked to confirm or revise these estimates" (p. 4). A similar method of consulting experts was used to estimate items not included in the Paley Report. Prices of imports were estimated in 1953 dollars, i.e. it was assumed that the general level of prices is that of 1953, but allowance was made for changes in relative prices. The price of each commodity in the mid 1970's was estimated by considering expert opinion on trends in world supply of and demand for that commodity. The volume and value of imports of 26 commodities were estimated in this fashion. The remaining imports (approximately 30 per cent of total imports) were estimated in three aggregative groups, "Other crude materials and semi-manufactures", "Other crude and manufactured foodstuffs", and "Manufactures". The total estimated value of imports is approximately twice the actual value in 1952. This is based on an assumption that gross national product will double over the period under review.

Although this estimated value of imports is inconsistent with the widespread belief that the marginal propensity to import in the United States will decline with the secular rise in income, it cannot be brushed aside. The method used is an advance over the aggregative method for import projections; and the author appears, if anything, to have erred on the conservative side in order not to overstate his case.

The commodities showing the greatest increase, petroleum, coffee, iron-ore, newsprint, nickel and aluminium, are such that a large part of the increases in imports will come from Canada and Latin America. The author is more optimistic than this reviewer regarding the extent to which Europe can replace U.S.A. in their markets in Latin America, if not in Canada, and the extent to which European imports from U.S.A. will not rise in the absence of controls. But this difference of opinion does not affect the main conclusion "that the key to the world's future dollar supply lies in Canada and Latin America" (p. 68).

J. W. NEVILE

University of New England.

Progress in Nuclear Energy, Series VIII: The Economics of Nuclear Power including Administration and Law. Volume I. Edited by J. GUERON, J. A. LANE, I. R. MAXWELL and J. R. MENKE. (Pergamon Press, London, 1956.) Pp. 532. £6 stg.

This study is one of the consequences of the International Conference for the Peaceful Uses of Atomic Energy, held just over a year ago at Geneva. It is a mine of information about actual and potential development of the use of nuclear energy in many countries and in terms of the whole world. In addition it is "a beginning in the formulation of techniques for economic evaluation of atomic power".

The editors were able to command the services of many of the most eminent authorities on the subject, and the authors (40 all told) had the most comprehensive data to work on. Collectively they appear largely to have been responsible for the Geneva Conference papers. The discussions at the conference and the work of the editors and editorial advisory board were obviously responsible for a high degree of integration in an extensive series of thumb-nail sketches of different aspects of nuclear power development and related studies in fuel and power economics.

The greater part of the analysis on the supply side is based on British, American, and Russian experience, but data relating to actual and potential demand (used as the basis for estimates of world energy requirements and nuclear power requirements in 1975 and 2000) has been obtained from all but very few of the national authorities. Reasonably comprehensive data is given for Australia, but that from New Zealand is extremely scanty.

Australia, it was said, appeared to be the only country represented at Geneva which was not enthusiastic about nuclear power development. However, the evidence given here and knowledge of later develop-

ments suggest that nuclear power could have an important role in Australian economic development in the next generation, though solar energy may be a more important source of industrial energy in the long run.

There is only a brief reference to nuclear fusion, which now appears to offer the most promising line of development. But it appears that power generated by atomic fission can compete with power from conventional sources in highly industrialised countries even where, as in the United States, there is still scope for expansion of hydraulic and coal-based production. In under-developed countries, on the other hand, comparatively high construction costs and interest rates, the comparatively low level of demand for power and discontinuity of demand, generally put nuclear development at a disadvantage compared with the development of conventional sources.

K. A. BLAKEY

University of New England.

Multiple-Purpose River Basin Development. Part 2B. Water Resource Development in Burma, India and Pakistan. (United Nations, New York, 1956.) Pp. 135. 11/- stg.

Progress in Land Reform. Second Report. (United Nations Department in Economic and Social Affairs, New York, 1956.) Pp. 190. $2·00. 14/- stg.

These two publications are valuable additions to the literature describing the problems faced and measures taken by underdeveloped countries in their economic development programmes.

The report by E.C.A.F.E.'s Bureau of Flood Control and Water Resources Development reviews for each of the countries dealt with, the present status of irrigation and hydro-electric works, the needs and potential for further development and the relationships between water resources and economic development generally. For each country a brief background description of the main climatic and physical features, population and land use situation is provided together with a summary of future developmental plans. A good job of collating and analysing hydrological and economic information has been done, especially since the region covered is by no means characterized by a surfeit of data. The report is lucid, systematic and succinct and is supported by numerous tables and maps. The information presented will be of interest not only to those directly interested in water resources *per se* or in economic development in Asia and the Far East. Future developments in these countries are of obvious significance for agricultural trade prospects.

The second report summarizes and analyses replies submitted by member countries to a questionnaire on land reform measures circulated by the United Nations in 1955. It supplements an earlier report and is intended mainly to cover developments during the period 1952-55. The fields covered, for both developed and underdeveloped coun-

tries, include land settlement, fragmentation and consolidation of holdings, agricultural credit, land taxation, conditions of employment, rural amenities, rural co-operatives and machinery services.

It is obviously not intended as a self-contained report. Indeed in isolation it would give a rather disjointed and inadequate picture of land problems and land policy since the content tends to be rather conjuncturally selected according to the completeness of the treatment in the earlier report and the emphasis given developments of varying importance in official replies to the questionnaire. It is a useful supplement, however, and provides much interesting information on the ways in which land tenure conditions retard agricultural development in various countries and on the action being taken to overcome these impediments.

J. N. Lewis

University of New England.

Political Economy. Issued by the Economics Institute of the Academy of Sciences of the U.S.S.R. (Lawrence & Wishart, London, 1957.) Pp. 841. 21/- stg.

This is not a book to be taken lightly. It has had record sales in Japan and it will presumably have a large readership in other less developed countries. With Russia's economic success now increasingly evident many people will turn to the economic basis of the Soviet system. The translation of the standard Russian textbook on Political Economy is, therefore, an important event.

Similar to our Stage I textbooks this is a general survey of economics. It is a work that puts keys into many doors, but it does not turn them. The advancing Soviet student must obviously specialize in the various aspects of economic science which are outlined in the book. To complain about lack of detail of treatment would be out of place with regard to such a work.

There are, of course, some grave shortcomings in the Soviet approach to economics. These become particularly glaring when the writers of the book deal with life in capitalist society now. This, however, must not close our eyes to the fact that, if the economists of Russia present a caricature of capitalism in the first part of the book, it is a caricature which is well recognizable in such countries as Italy, Japan, possibly India and so on.

The important aspect of the book is, however, its positive contribution to an understanding of Soviet development. True to Marxian tradition the book is emphatically historical and political. It shows the world in the making, and changing, and it stresses again and again that without political changes economic progress cannot occur. Thus, naturally in a Soviet textbook, great weight is put on the fact that only the socialization of the means of production, brought about by the organized working class, can remove the obstacles to development which are considered to be inherent in capitalism at its present stage.

Western economists tend to be somewhat impatient of Marxist terminology, so it may not be wise to quote verbatim the reasons for the need for socialization by the organized working class (see page 172). But the long and the short of the matter is that Soviet economists are convinced that there is a profound contradiction in the fact that the product of the social labour of millions should, where private property in the means of production prevails, become the private property of a relatively few capitalists. The increasing integration of our productive mechanism, in other words, puts too much responsibility on the individual entrepreneur and the slackening or breaking of one single link in that long chain of production which is our modern economy can have severely retarding effects on development. The essence of crisisless development, it is insisted again and again, is a well planned proportional development. But where competition and private enterprise prevail disproportions are liable to occur.

Against the tendency of sectors of capitalist economies to develop in an uneven way, the textbook puts the "basic economic law of socialism". This law is the "economic law of planned (proportional) development of the national economy" (p. 429). Planning which leads to fast development is defined as "constant, deliberately supported proportionality" (p. 547). The basic key to planning is the fundamental economic law of socialism (as defined by Stalin in his *Economic Problems of Socialism in the U.S.S.R.*): "The securing of the maximum satisfaction of the constantly rising material and cultural requirements of the whole of society, through the continuous expansion and perfection of socialist production on the basis of the highest techniques" (quoted on page 530 of the present volume).

The planned management of the Soviet economy singles out the most important branches, on which successful fulfilment of the national economic plan depends. The key links of the Five Year Plans were the branches of heavy industry. In fact the priority development of producers' and heavy industries is considered an essential law of socialism. The other branches are planned to conform to the leading branches, so that the whole economy will advance and its component parts will be co-ordinated as rationally as possible (see p. 555).

Emphasis on "highest techniques" is important. The book emphasizes (p. 561) that "in socialist economy science and technology develop in a planned way, corresponding to the needs of the economy. The continuous growth of socialist production on the basis of the highest techniques requires a steady rise in the cultural and technical level of the working people and an increased proportion of skilled workers in all branches of the national economy. The training of workers in a planned way and on a mass scale has been achieved under socialism for the first time in history."

These statements might have appeared somewhat grandiloquent even two years ago. But the sudden realization of the size of Russia's scientific training programmes puts them in a somewhat different light now. The same may be said about the possibility of perfect co-ordina-

tion of all sectors of production by central planning. National input-output analysis in our parts of the world shows what is possible, and when reporting of figures is centralized and organized on the basis of State-owned industry, some of the problems of national economic planning seem to acquire a more manageable shape.

Of great interest to students in under-developed countries must also be the enumeration of the reasons why backward, agricultural Russia could in forty years (punctuated by civil and international wars) achieve the industrial prominence she has now.

Under the heading "The Socialist Method of Industrialization" we find the following points:

(1) The expropriation of landowners and capitalists made it possible to use for industrialization a considerable part of the resources which had formerly been used in luxury consumption. (The wording of the text (p. 448) is "formerly been appropriated by the exploiters and expended on parasitic consumption").

(2) The abolition of rent payments to landlords put purchasing power in the hands of the peasantry which could be used for the development of industry.

(3) The cessation of payments of interest and dividends abroad due to the repudiation of foreign debt made the country economically more independent than it had been formerly.

(4) The concentration of all monetary resources in the hands of the State rendered possible their planned use for industrial development. Resources were spent only on what were considered the most important rquirements of industrialization, thus securing a firm basis for development.

(5) New industries are almost without exception of a large size and have all the advantages of large scale.

(6) Finally, the feeling that workers were building according to plan for themselves and not for the profit of employers created possibilities of labour enthusiasm which rendered possible the creation of industries under conditions not tolerable in any other situation.

The textbook, however, never tires of emphasizing that enthusiasm is not enough. There are still many survivals of the past and the Soviet worker must have a material as well as a spiritual incentive. (Possibly some of the incentives were "stick" as well as "carrot".) Piece work is proclaimed as the ideal weapon of socialist production where everyone is paid according to his work; and petty-bourgeois equalitarians with a preference for time wages are roundly condemned.

Similarly, correct physical planning is considered not enough. Physical planning must go hand in hand with a pricing policy which reconciles planned supply and demand (p. 588). This does not mean that the consumer is altogether forgotten:

> Trading organizations must be able quickly to adapt themselves to changes in demand. . . . It is the function of Soviet trade to exercise an active influence on production for the purpose of increasing the output of commodities which correspond to the demand of the population" (p. 673).

It is clearly imposible to do justice to a work of 858 pages (including a very detailed index) within the scope of this review. It may, however, be pointed out that the writers of the textbook are fully aware of the fact that classes still exist within the Soviet Union (industrial working class, peasantry and intelligentsia) and that there are many contradictions left within the Soviet economy which must be discovered and resolved. What they emphasize is that the contradictions which do exist are "non-antagonistic" whereas under capitalism they are antagonistic and cannot be resolved but by consistent class struggle.

The book is written on a historical note, starting with stone-age man and ending up with the glowing hope of a socialist transition (peaceful) from socialism (everyone according to his work) to communism (everyone according to his needs). Students who have been brought up with such an outlook must become largely impervious to a striving for what they must undoubtedly consider a "return" to capitalism.

In spite of many slighting criticisms of the work (of which the most outstanding appeared in *The Economist* of 20/7/1957) the reviewer wonders if here is not in the long run a more potent Soviet weapon than Satellites and Intercontinental Ballistic Missiles.

W. ROSENBERG

University of Canterbury, Christchurch, N.Z.

BOOKS RECEIVED*

A.—AUSTRALIAN AND NEW ZEALAND PUBLICATIONS

ARNDT, H. W. *The Australian Trading Banks.* (F. W. Cheshire, Melbourne, 1957.) Pp. 216. 27/6 Aust.

BORRIE, W. D., and DEDMAN, Ruth. *University Enrolments in Australia 1955-70.* (Australian National University, Canberra, 1957.) Pp. 20. 3/6 Aust.

MACKAY, IAN K. *Broadcasting in Australia.* (Melbourne University Press, Carlton, Victoria, 1957.) Pp. 216. 25/- Aust.

SCOTT, WALTER. *Australia and the Challenge of Change.* (The Law Book Co. of Australasia, Sydney, 1957.) Pp. 540. 75/- Aust.

UNIVERSITY OF MELBOURNE. *Discovery* No. 2. (University of Melbourne, 1957.) Pp. 96 + cover. 2/6 net Aust.

Discovery gives a simple description of some of the research projects recently undertaken in the University of Melbourne. Twenty articles are included under five main headings—Medicine, Science, the Humanities, Technology and the Social Sciences—and there are many excellent photographs and drawings. Readers of *The Economic Record* will be particularly interested to see an interim report from the Department of Economic Research on an investigation of the causes and consequences of industrial innovation in the Australian economy.

In all, *Discovery* presents a very effective reminder that the function of a university is not only to teach undergraduates, but also to enlarge the boundaries of knowledge.

WHEELWRIGHT, E. L. *Ownership and Control of Australian Companies.* (The Law Book Co. of Australasia, Sydney, 1957.) Pp. 206. 42/- Aust.

WALKER, K. F. (ed.). *Automation.* (Addresses to the Second Labour-Management Conference at the University of Western Australia.) (University of Western Australia Press, 1957.) Pp. 93. 5/- Aust.

In recent years, the mysterious word "automation" has crept into popular usage without adequate understanding of its meaning or its economic, human and social implications. Some regard it as an unmitigated evil, to be strongly resisted; at the other extreme, it is viewed as a promise of a bounteous era. This book deals with all these questions briefly and intelligibly, even if many of the conclusions are tentative. It contains contributions by experts in a variety of fields—engineering, psychology, economics, union and management.

WYNES, W. ANSTEY. *Legislative, Executive and Judicial Powers in Australia.* (2nd ed.) (The Law Book Co. of Australasia, Sydney, 1956.) Pp. 768. £4/15/- Aust.

B.—OTHER PUBLICATIONS

AITCHISON, J., and BROWN, J. A. C. *The Lognormal Distribution with special reference to its Uses in Economics.* (Cambridge University Press, 1957.) Pp. 176. 35/- stg.

This is a clear account of the genesis of the lognormal distribution and of problems of inference associated with its use. It could be read comfortably by people having only a moderate mathematical equipment. Amongst the applications of the theory have been the description of income distributions and the analysis of consumers' behaviour; these are considered in detail.

ALBERS, WILLI. *Die Einkommensbesteuerung in Frankreich seit dem Ersten Weltkrieg.* (Institut für Weltwirtschaft an der Universität Kiel, Kiel, 1957.) Pp. 320. DM. 36.

BOULDING, KENNETH E. *The Image.* (University of Michigan Press, Ann Arbor, 1956.) Pp. 175. $3·75.

The booklet contains Professor Boulding's musings after attending a "cross-fertilization retreat" at the Behavioural Sciences Centre at Stanford. Feedbacks and communication, the sociology of knowledge, homeostasis in

* Acknowledgment of publications does not guarantee review.

biological systems, the essence of political and religious ideas, recent trends in social psychology, and many more topics have been chatted over both playfully and seriously. Naturally there are no tangible results, but we have an interesting, intimate record of the state of mind that drives one of the liveliest economists today to break out from the narrow confines of his subject.

CHAMBER OF COMMERCE OF THE UNITED STATES. *The Mechanics of Inflation: An Analysis of Cost and Demand Pressures on the Price Level.* (Chamber of Commerce of the U.S., Washington, 1957.) Pp. 67. $1·00 (single copy).

CHURCHMAN, C. W., ACKOFF, R. L., and ARNOFF, E. L. *Introduction to Operations Research.* (John Wiley & Sons, New York, 1957.) Pp. 645. $12·00.

In this work the authors have presented with obvious enthusiasm an introduction to a rapidly growing field of scientific research. Their aim is to provide a basis for grasping the wide scope of operations research and for evaluating and understanding its procedures and potentialities. Inventory, Allocation, Waiting-Time, Replacement and Competitive processes are dealt with lucidly and the relevant mathematical techniques (e.g. Linear Programming, Games Theory) are explained.

CLARK, J. B. *The Distribution of Wealth.* (Kelley & Millman, New York, 1956.) Pp. 445. $8·50.

A reprint of Clark's classic work, which constitutes a useful and important addition to the Kelley and Millman Series.

COLE, G. D. H. *The Case for Industrial Partnership.* (Macmillan, London, 1957.) Pp. 121. 12/6 Aust.

COLE, G. D. H. *The Post-War Condition of Britain.* (Routledge & Kegan Paul, London, 1956.) Pp. 483. 40/- stg.

COX, P. R. *Demography and Addendum to Demography.* (Cambridge University Press, 1957.) Pp. 306. 25/- stg.

CROSSER, P. K. *Economic Fictions: A critique of Subjectivistic Economic Theory.* (Philosophical Library, New York, 1957.) Pp. 322. $4·75.

DAVIDSON, R. K. *Price Discrimination in Selling Gas and Electricity.* (The Johns Hopkins Press, Baltimore, 1955.) Pp. 254. $4·00.

This book examines theoretical and practical aspects of gas and electricity charges. Chapters 1-5 are a restatement of price discrimination theory. Subsequent chapters include discussion of types of rate schedules, possible methods of cost allocation, various types of discriminatory rate schedules and, finally, an examination of actual rates of the Consolidated Gas, Electric Light and Power Company of Baltimore. Absence of adequate discussion of recent utility rate experience in other countries is an unfortunate omission in this otherwise useful little book.

DAY, A. C. L. *Outline of Monetary Economics.* (Oxford University Press, London, 1957.) Pp. 559. 55/6 Aust.

DIAB, M. A. *The United States Capital Position and the Structure of its Foreign Trade.* (North-Holland Publishing Co., Amsterdam, 1956.) Pp. 67. 20/-.

DOMAR, EVSEY D. *Essays in the Theory of Economic Growth.* (Oxford University Press, New York, 1957.) Pp. 272. $4·50.

DUE, J. F. *Sales Taxation.* (Routledge & Kegan Paul, London, 1957.) Pp. 396. 40/- stg.

DUNLOP, JOHN T. (ed.). *The Theory of Wage Determination.* (Macmillan, London, 1957.) Pp. 437. 51/6 Aust.

This book contains 21 papers presented at the International Economic Association's Conference held at Seelisberg in 1954. In addition to the papers there is a summary record of the debate by D. C. Hague. The opening paper by Dunlop sets the tasks of contemporary wage theory: the necessity of linking general wage level analysis with the wage structure; relating short term and long term factors in wage determination; weighting the influence and role of the trade union and collective bargaining in wage theory, etc. These issues are treated by various writers. Both the theory and practice of wages are discussed; there are commentaries on the French, Swedish, British and American experience, and there is room in the book for at least one sophisticated model. In total, the book represents a valuable contribution to the present debate on wage theory and should serve teaching purposes for the more advanced student of economics.

FRANKEL, MARVIN. *British and American Manufacturing Productivity.* (Bureau of Economic and Business Research, University of Illinois, Urbana, 1957.) Pp. 130. $1·50.

This work is mainly concerned with explaining the superior productivity of American over British manufacturing industries. The analysis covers the effect of resources, plant and equipment, plant size and market size on productivity, mainly for 1947/8. A brief historical analysis of manufacturing productivity differences between the two countries is given in the latter part of the book.

G.A.T.T. *International Trade 1956.* (General Agreement on Tariffs and Trade, Geneva, 1957.) Pp. 278. $2·00.

GRAAFF, J. de V. *Theoretical Welfare Economics.* (Cambridge University Press, 1957.) Pp. 178. 22/6 net stg.

Dr. Graaff in this brilliant book presents the most general critical exposition of modern welfare economics written to date, deducing conditions for a general optimum from a systematic treatment of social transformation, and community indifference curves—stressing external "economies" in both—brought together to produce the welfare frontier. There follow chapters on particular issues—compensation tests, protection, marginal cost pricing, index numbers and others. Throughout, the role of ethical judgments is highlighted, and the value of welfare economics for prescriptive purposes is challenged and usually rejected. Though "sustained mathematical argument" is confined to Appendices to four chapters, the book is concise and difficult. Both Author and Subject Indexes are provided.

GUERON, J., LANE, J. A., MAXWELL, I. R., and MENKE, J. R. (eds.). *Progress in Nuclear Energy, Series VIII: The Economics of Nuclear Power including Administration and Law.* (Pergamon Press, London, 1956.) Pp. 532. £6 stg.

HARPER, F. A. *Why Wages Rise.* (Foundation for Economic Education, New York, 1957.) Pp. 124. $1·50.

HEATH, SPENCER. *Citadel, Market and Altar.* (The Science of Society Foundation, Elkridge, Maryland, 1957.) Pp. 259. $6·00.

HUGH-JONES, E. M. *Automation in Theory and Practice.* (Macmillan, London, Basil Blackwell, Oxford, 1956.) Pp. 140. 20/9 Aust.

INTERNATIONAL LABOUR OFFICE. *Problems of Wage Policy in Asian Countries.* (I.L.O., Geneva, 1956.) Pp. 141. $1·25. 7/6 stg.

ISARD, WALTER. *Location and Space-Economy.* (The Technology Press, Massachusetts Institute of Technology, John Wiley & Sons, New York, 1956.) Pp. 350. $8·75.

The author is Professor of Economics in the University of Pennslyvania. For some ten years the author has been collecting evidences of the inadequacies of the approaches of Weber, Zipf, and many others in the fields of space-economy and location of undertakings. In the present volume he clearly shows how trade-theory and location-theory are interrelated, and investigates their applications to such day-to-day problems as city planning, marketing analysis, urban renewal, and land use generally. The reasoning is supported by numerous excellent tables and graphs.

A further volume carrying the problem a good deal further than has been possible up to now is contemplated in due course.

JAIN, P. C. *Problems in Indian Economics.* (3rd Ed.) (Chaitanya Publishing House, Allahabad, 1956.) Pp. 688. Rs. 11/8. 25/-.

KNORR, KLAUS. *The War Potential of Nations.* (Princeton University Press, Princeton, 1956.) Pp. 310. $5·00.

KOSIOLEK, HELMUT. *Probleme der Wirtschaftsentwicklung der Deutschen Demokratischen Republik in der Zeit von 1950-1955.* (Institut für Weltwirtschaft an der Universität Kiel, Kiel, 1957.) Pp. 22. DM. 1·50.

LAUTERBACH, ALBERT. *Increasing the Wealth of Nations.* (Public Affairs Press, Washington, 1957.) Pp. 40. Price not stated.

LUNDBERG, ERIK. *Business Cycles and Economic Policy.* Translated by J. Potter. (George Allen & Unwin, London, 1957.) Pp. 346. 32/- stg.

MADAN, B. K. *Financing the Second Five-Year Plan.* (Gokhale Institute of Politics & Economics, Poona, 1957.) Pp. 24. Re. 1.

Main Belgian Congo and Ruanda-Urundi Agricultural Products: Annual Review 1956. (Société Commerciale Anversoise, Anvers, Belgium, 1957.) Pp. 229. Price not stated.

MALTA PUBLICITY SERVICES LTD. *The Malta Directory & Trade Index 1957.* (Malta Publicity Services, Valletta, 1957.) Pp. 400. 25/6 net.

VON MANGOLDT-REIBOLDT, H. K. *Währungspolitische Probleme der Europäischen Wirtschaftsintegration.* (Institut für Weltwirtschaft an der Universität Kiel, Kiel, 1957.) Pp. 18. DM. 1·50.

MAYER, H. M. *The Port of Chicago and the St. Lawrence Seaway.* (The University of Chicago Press, 1957.) Pp. 283. $5·00.

MEIER, G. M., and BALDWIN, R. E. *Economic Development: Theory, History, Policy.* (John Wiley & Sons, New York, Chapman & Hall, London, 1957.) Pp. 588. Price not available.

MILBANK MEMORIAL FUND. *The Nature and Transmission of the Genetic and Cultural Characteristics of Human Populations.* (Milbank Memorial Fund, New York, 1957.) Pp. 143. $1·00.

MITCHELL, YVONNE. *Actress.* (Routledge & Kegan Paul, London, 1957.) Pp. 111. 15/- stg.

MOSER, C. A. *The Measurement of Levels of Living with Special Reference to Jamaica.* (H.M. Stationery Office, London, 1957.) Pp. 106. 13/6 net stg.

MUND, V. A. *The Right to Buy—and its Denial to Small Business.* (United States Senate: Report of Select Committee on Small Business.) (U.S. Government Printing Office, Washington, 1957.) Pp. 118. Price not stated.

This is a report prepared by Dr. Mund for the U.S. Senate Select Committee on Small Business. It deals with the nature, extent and effects, particularly on small business, of the discriminatory and exclusionary practice of refusal to sell; the development of the right to buy in open markets; the law and legal decisions on refusals to sell with particular reference to resale price maintenance, the selection of distribution outlets and exclusive-dealing arrangements; remedial legislative and administrative measures to make effective the right to buy.

NARASIMHAM, N. V. A. *A Short Term Planning Model for India.* (North-Holland Publishing Co., Amsterdam, 1956.) Pp. 93. 20/- stg.

The model contains definitional relations (incomplete); relations for the demand for and the supply price of goods and services for consumption, investment goods, farm and non-farm raw materials and labour; a demand relation for imports; gross profit relations for corporations and for other enterprises; and tax yield relations. Many of these relations are estimated statistically (without, however, taking into account their strong interconnections) and applied to broad policy problems.

NUTTER, G. W. *Some Observations on Soviet Industrial Growth.* (Occasional Paper 55.) (National Bureau of Economic Research, New York, 1957.) Pp. 16. 50c.

PATTERSON, GARDNER, and FURNISS, EDGAR S., JR. *NATO—A Critical Appraisal.* (Princeton University Conference on NATO, Princeton, 1957.) Pp. 107. Price not stated.

POLANYI, KARL, ARENSBERG, C. M., and PEARSON, H. (eds.). *Trade and Market in the Early Empires.* (Free Press, Glencoe, Illinois, and Falcon's Wing Press, 1957.) Pp. 382. $6·00.

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SIMON, H. A. *Models of Man. Social and Rational.* (John Wiley & Sons, New York, 1957.) Pp. 287. $5·00.

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TROY, LEO. *Distribution of Union Membership among the States.* (Occasional Paper 56.) (National Bureau of Economic Research, New York, 1957.) Pp. 32. 75c.

TURVEY, RALPH. *The Economics of Real Property.* (George Allen & Unwin, London, 1957.) Pp. 150. 16/- stg.

The author is Reader in Economics in the University of London.

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